

THE IRON AGE

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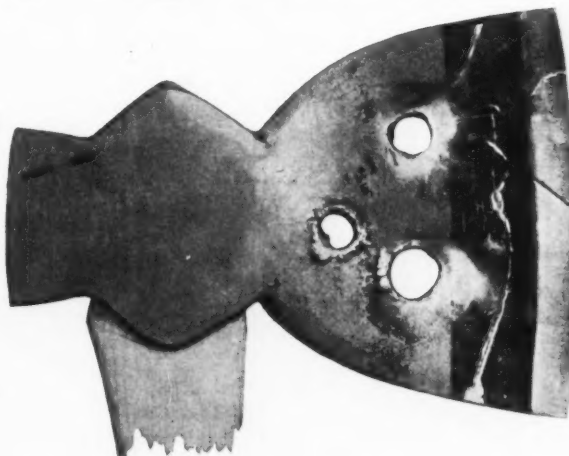
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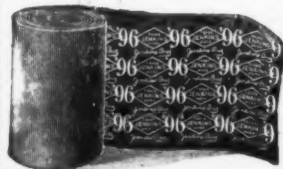
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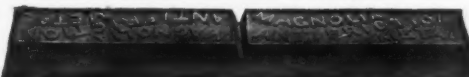


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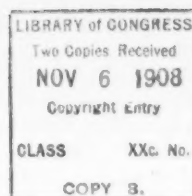


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THE IRON AGE

New York, Thursday, November 5, 1908.



Brightman Shafting Machinery.

Machinery for finishing shafting, bronze rods, tubing, &c., by the turned process in all sizes from 1 to 6 in., inclusive, is built by the Brightman Mfg. Company, Shelby, Ohio. The product heretofore has been intended principally for the larger plants, but recently the company has designed equipment for shafting users who wish to make it for themselves. One of the first essentials was

is centered by a guide roller placed in front of the feeding roller, which has a perpendicular adjustment, and the feed rollers provide lateral adjustment. After leaving the feed rollers the material enters a hollow cylinder through a bushing to the guide head. This guide head contains guides set in segmental slots, and having screw adjustment. The material then passes to the cutter head which contains steel cutters and guides set in segmental slots, which cutters and guides also have screw adjustment. This cutter or finishing head turns the material

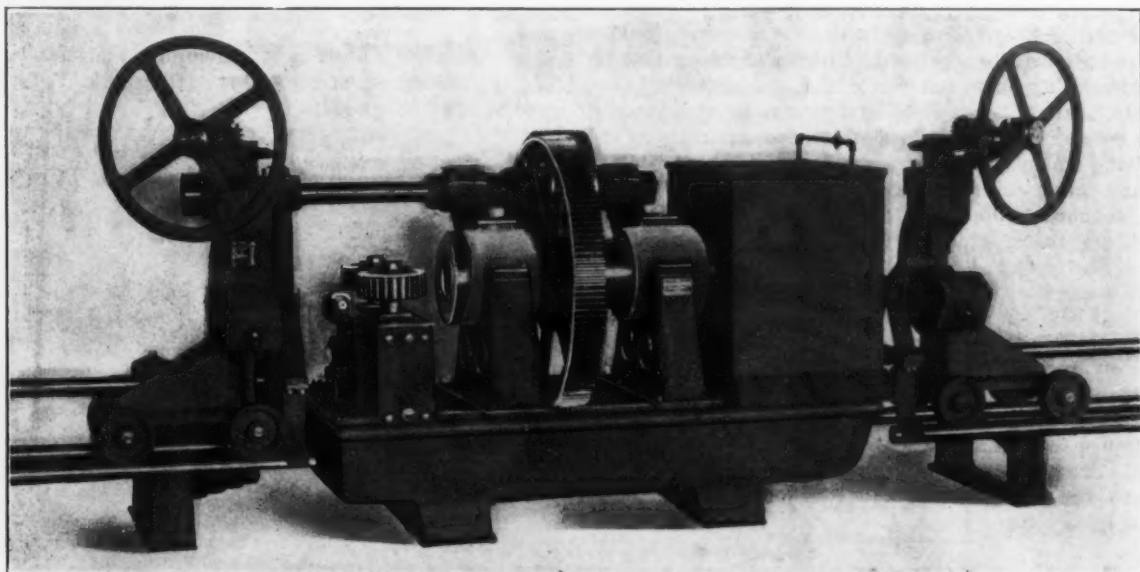


Fig. 1.—Turning Machine for Shafting. Built by the Brightman Mfg. Company, Shelby, Ohio.



Fig. 2.—Brightman Shaft Straightening and Finishing Machine.

a lower cost of production of the machines in question and more compact form. To these ends all unnecessary appurtenances have been eliminated, with the result that the machines can be sold at a price fairly competitive with that asked for the ordinary class of machinery that is used for this work.

Fig. 1 shows the turning machine. The rough bar, tube or rod is fed in at the left end by a set of feed rollers which are driven through worm wheels and worms attached to perpendicular and horizontal shafts, from a four-step cone pulley to regulate the feed. The material

is centered by a guide roller placed in front of the feeding roller, which has a perpendicular adjustment, and the feed rollers provide lateral adjustment. After leaving the feed rollers the material enters a hollow cylinder through a bushing to the guide head. This guide head contains guides set in segmental slots, and having screw adjustment. The material then passes to the cutter head which contains steel cutters and guides set in segmental slots, which cutters and guides also have screw adjustment. This cutter or finishing head turns the material

to size, after which it is ready for the straightening or finishing machine, shown in Fig. 2. The heads of the turning machine are bolted to a cylinder having hollow bearings, through which the material passes in the process of turning. The cylinder is driven through a gear by a pinion on a horizontal shaft. The bed of the machine is a receptacle for a soap solution which is continually pumped to the cutters by a small pump in the rear of the machine. This solution drains back into the bed and is used over repeatedly. A casing that surrounds the cutter heads retains the chips or turn-

ings, which can be readily cleaned out while the machine is in operation through side openings in the casing. At each end of the machine tracks are provided upon which a gripping device travels which will hold the material from revolving with the machine. Material as short as 8 ft. can be turned, and there is no limit to the length except the space allowed in the building.

The machine illustrated in Fig. 2 is for the purpose of straightening rounds in the solid, both rough and finished, steel pipe, bronze rods, tubes, &c. The straightener consists of a bed with upright pedestal bearings, supporting a revolving frame which has hollow journals and the straightening mechanism. The latter consists of three rolls having concave surfaces. The rolls are supported by bearing blocks, having a swivel and screw adjustment. The roll supports are secured to the revolving frame so as to project alternately from opposite sides.

At each end of the straightener, tracks are provided upon which travels a gripping device similar to that on the turning machine and performing the same function, namely, that of holding the material to be straightened from revolving. The contact of the concave rolls in the revolving frame will produce varying speeds according to the amount of concave surface put on the rolls. A certain amount of slipping of the rolls on the work occurs which has the effect of producing a very fine finish, as well as straightening the shafting. The rolls are adjusted at an angle to the shaft according to its diameter, and each roll has a segmental line of contact with the shaft. This will prevent all gouging out or breaking of edges of flaws or cracks which might be found in the surface of the material, and will admit of such flaws and cracks being smoothed over.

Both machines are furnished for either belt or motor drive. The turning machine weighs approximately 13,000 lb. and the straightening and finishing machine about 21,000 lb.

Galvanized Steel Grillage Beams.

The receivers of Milliken Brothers, Inc., 11 Broadway, New York, have lately made some extensive experiments in connection with protecting from oxidation the steel grillage beams used in building construction. More or less water is present in nearly every building where grillage beams are used. Therefore, unless the beams are absolutely protected, there will be oxidation. As such beams are not usually exposed to view and cannot be examined, if oxidation takes place after the building is up and the oxidation becomes serious, the security of the building is threatened.

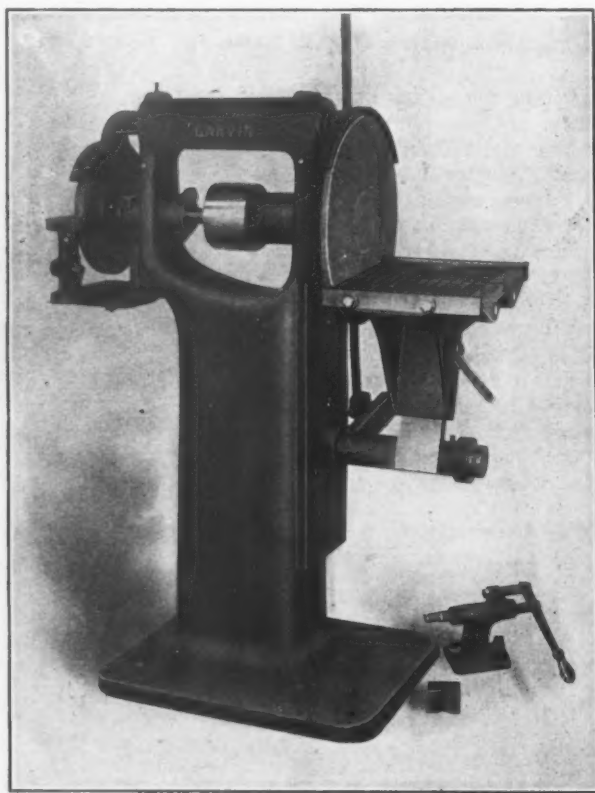
Finding that coating the beams with paint, asphalt or tar cannot be absolutely relied on for a great length of time, Milliken Brothers have experimented with galvanizing by the hot process, after all the shop work has been done on the steel. It has been shown that concrete will adhere to galvanized steel beams as firmly as to unpainted beams which are largely used for grillage work and much better than to painted beams. Architects and engineers who have had occasion to examine galvanized Ashlar anchors and galvanized pipes used in connection with concrete have found that concrete will attach itself as readily to galvanized material as ungalvanized material. The advantage of galvanizing is that it gives the steel beam a complete zinc coating, which will resist the action of the water and therefore protect the steel. The expense connected with the galvanizing is considered small in comparison with the resulting benefits.

A British Marine Engine Consolidation.—The *Liverpool Journal of Commerce* of October 24, says: "We are in a position to state, with official confirmation, that the whole of the marine engine works of the northeast coast are on the eve of jointly signing a working agreement in the form of an amalgamation representing firms valued at a total of £5,000,000. The scheme includes practically all the marine engine firms carrying on business on the Tyne, Wearside, Tees and at Hartlepool. It is expected that the signatures will be all completed within the next

week. Negotiations have been proceeding for eight months. The basis of the scheme is economy in production, by concentration of management, classification and standardization of work so as to get the maximum amount of production from the different classes of machinery. There will also be a scheme of proportionate pooling of profits."

A Garvin Combination Grinder.

An 18-in. disk grinder has been brought out by the Garvin Machine Company, New York City, the frame of which suggests the company's specialty—milling machines. The unique feature of the grinder is the manner of oscillating the work table. The oscillating is accomplished by power from a crank pin in a worm wheel on the overhead countershaft, which is connected by a rod to a rocker carrying the table. The rocker arm is slotted where the rod connects to it, providing an adjustment for varying the extent of the swing of the table. The table



A New Wheel and Disk Grinder Built by the Garvin Machine Company, New York.

has vertical adjustment of $3\frac{1}{2}$ in., its surface has adjustable squaring edges, and it also has an extension that draws out for long work.

Opposite the 18-in. disk wheel is a solid 12-in. emery wheel, with a guard and work support. The lever tail-stock shown on the floor at the base of the machine is used for grinding off round washers or collars. The V block fits in a groove in the table, and is used for finishing the ends of shafts, removing the burr which comes from cutting off or centering. Grease cups are provided for the oiling of all bearings to exclude emery dust and grindings.

A new plan is followed in putting on the emery disks. The disks are kept in stock, and have their backs already coated with a glue preparation that when moistened causes the disks to adhere firmly to the steel disk without requiring a press for applying them. The weight of the machine is 1150 lb.

By an unusual coincidence, the White Star Line's largest three steamers were at dock in New York at the same time last week, as follows: Adriatic, 25,000 tons; the Celtic, 21,035 tons, and the Baltic, 23,876 tons. These vessels total 69,911 tons, surpassing the displacement of the famous Spanish Armada by 10,791 tons.

Woods Truing Devices for Wood Planer Heads.

In developing its specialty, wood planing machinery, the S. A. Woods Machine Company, Boston, Mass., has demonstrated that to increase the capacity and improve the product of a planer, harder knives, better grinding and more accurate setting are important. In this connection the company has brought out a truing device for

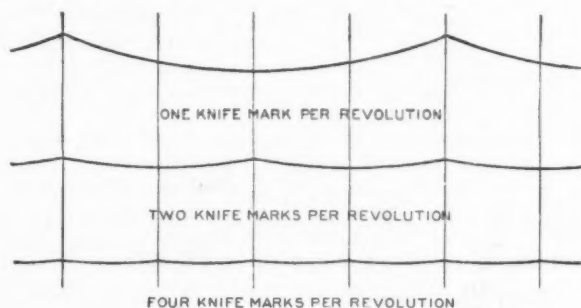


Fig. 1.—Comparison of Knife Marks on a Board Surface.

grinding the cutting knives while they are revolving at cutting speed, and thereby true them so that the several knives will follow one exact path, each doing the same amount of work as the others.

It has been found that no matter how careful the setting of the knives in the head while it is at rest, inaccuracies develop when it is set in motion, as evidenced by the knife marks on the wood, that made by one blade being always more prominent than the others. This is known as the revolution mark, as distinguished from the individual knife mark, which is left by each knife of a

individual knife marks, when all teeth are cutting equally, would measure 13 to the inch. The revolution marks made by one knife which does more than its share of the work would be one-quarter as close, or $3\frac{1}{4}$ marks to the inch. These relations, exaggerated, are shown in Fig. 1.

Experiments have proved that, owing to centrifugal force, the setting of knives while the head is at rest, no matter how accurately this may be done, will yield to distortion when the head is speeded up; therefore the necessity of truing the knife edges while the head is running at working speed. After the edges become dulled another truing restores them to their required keenness, and the process may be repeated until the heel produced by the grinding becomes so large as to be objectionable.

The truing device shown in Fig. 2 is typical of the line. It consists of a straight slide bar with a slide carrying an abrasive stick. In operation the slide bar is set parallel to the cutting cylinder and the slide is slowly moved from end to end while the cutter head is revolving. Provision is made for moving the stick toward or away from the head, and holding it firmly to the work.

The top truing device is a permanent fixture of the

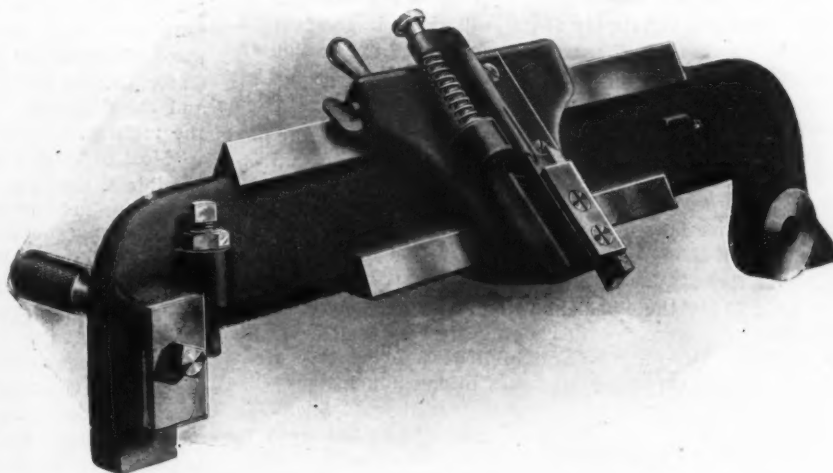


Fig. 2.—A Top Truing Device for a Planer and Matcher Made by the S. A. Woods Machine Company, Boston, Mass.

machine to which it is attached, being firmly hinged so that it may be swung back out of the way when not in use, as shown in Fig. 3. On the planing and matching machines the bottom device always remains in position, the slide being drawn out to one side when not in use, as

also shown in Fig. 3. The truing process on the bottom head can be completed without stopping the machine or raising the top cutter head. On the molders the bottom truing device is detachable, the drop table being swung down to permit of attachment or removal.

The company also makes a side head truing device, which is rigidly held on the matcher plate and is moved vertically past the cutters by a screw and crank. Angular adjustment may be made for truing the cutters to give a bevel edge on the stock. The device may be quickly attached or removed while the machine is running.

The truing devices work equally well with knives of high speed steel. The operator is cautioned, however, to take special care in this work, because the sparks given off are very dull, and hardly visible in a bright day, making it necessary to rely on feeling and sound rather than sight to determine when the process of truing is complete.

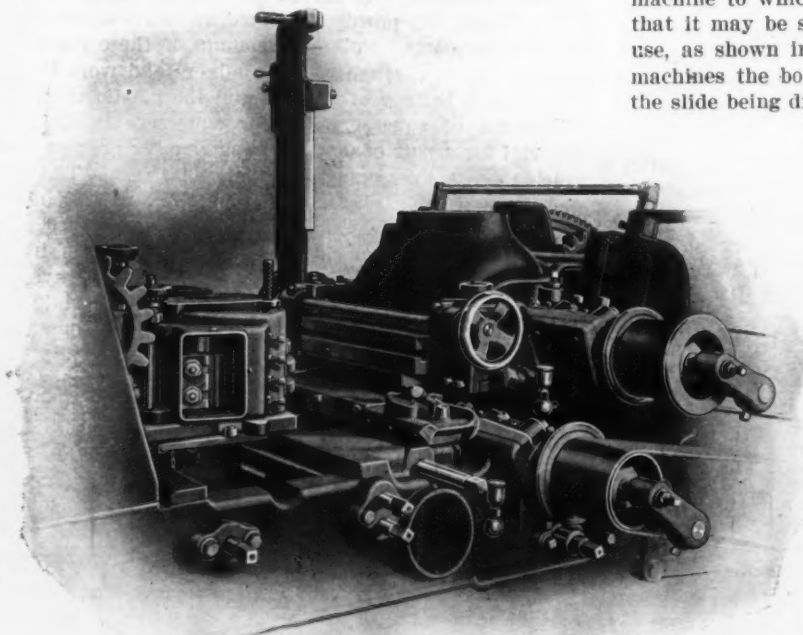


Fig. 3.—A Planer and Matcher with Top and Bottom Truing Devices Out of Action.

head that has been carefully trued at its regular cutting speed. The difference is readily apparent in the finish of the board. Thus with a feed of 100 ft. and a speed of 3900 rev. per min. by a four-knife cutter head, the

TOOL STEEL MAKING IN STYRIA.*

BY R. F. BÖHLER.

In a metallurgical sense the Austrian Empire is one of the richest countries of Europe, and Styria especially is and always has been the ideal country for tool steel making. It possesses the most extensive and excellent supplies of spathic ores, while its forests furnish charcoal and its mountain torrents abundant water power. It is only natural that the history of the Styrian steel trade should be a venerable one and its origins be lost in the mists of remotest antiquity.

In Roman times Styrian steel was famous. To quote Swank on this point: "Among the provinces which contributed largely to the Roman supply of iron was Noricum corresponding to Styria and Carinthia in Austria. Both Pliny and Ovid who lived at the beginning of the Christian era speak of Norican steel as being of superior quality, and it is certain that ferrum Noricum was celebrated throughout Italy before their day. The best of swords were made from it in the reign of Augustus. Horace speaks of them. The spathic ores of Styria are still in high favor and the supply of ore, especially in the famous iron mountain of Erzberg, shows no sign of exhaustion at the end of twenty centuries of almost constant use." In the eighth century mining was taken up again at the Erzberg and has not been stopped since. Throughout the middle ages Styrian steel was considered superior beyond comparison, and was in fact shipped to the remotest corners of the civilized world, which is astonishing, if we stop to think how difficult, slow and unsafe transportation was in those times of the "Holy Roman Empire of German Race."

About 1740 the Sheffield watchmaker, Huntsman, for the first time succeeded in refining steel by melting it in a crucible. He, however, exhibited the "worldly wisdom," as Percy politely styles it, of keeping his process secret. According to the popular tradition of Sheffield, knowledge of the process was finally obtained by the "heartless and knavish trick of a rival steelmaker," who, disguised as a shelter seeking vagabond, stole the secret and made it the property of the metallurgical world.

The Styrian Steel Makers are Progressive.

Now Styria was the ideal country to take up the new process. For, besides its pure ores, its charcoal and water power, it moreover possessed both graphite and clay excellently fit for crucible making, while other countries get the graphite, for instance, all the way from Ceylon. Raw steel, the material of old fame and produced in the old way on the charcoal hearth, was now used for remelting in the newly introduced crucibles, and in fact still is to-day. This accounts for the rather widespread opinion that Styrian steelmakers are incurable, sticking to old-fashioned methods and afraid of improvements. This widespread opinion is, it is safe to say, a widespread mistake. They do keep up old methods until the new ones prove superior, but they do not drop them for cheaper ones at the cost of the product. On the contrary, Styrian steelmakers have always been the very pioneers of progress. At Urtl, for instance, a blast furnace is recorded to have been in operation since 1567, and puddled steel was regularly produced as far back as 1835. Another instance is the history of tungsten steel. Franz Mayer of Styria is assigned the credit of having first applied tungsten to cast steel on a large scale. He exhibited samples of it at the Vienna Congress of 1858 at a time when tungsten alloy steel was generally considered a ridiculous experiment. Franz Mayer himself perhaps realized to a moderate degree only the most astounding development tungsten steel was to take. The path he showed us has led to quite unexpected points of view and actually to a new world, metallurgically speaking, the world of high speed work.

Not wishing to dwell upon the tool steelmaking process in general, I shall merely mention a number of special features characteristic of Styria which, it will be seen,

are so many special reasons for the superiority of Styrian tool steel.

Modern Appliances.

Take for instance the Kapfenberg works, the largest crucible steel plant in existence, situated about an hour's ride from the old iron city of Leoben of mining school fame. Founded in 1446, they are at the same time the most ancient and the most modern. The entire heat treatment throughout the work is under control of an extensive pyrometric system and the latest types of electric hardening, annealing and melting furnaces are in use, as well as all of the modern physical and microscopical testing devices. Different from the methods customary in this country, the crucibles at Kapfenberg are manufactured on the premises and are used only once, although the majority of them would be able to bear a second or third charging. The reason for limiting their use to one heat only is to be found in the nature of the crucible process, which, far from being a mere remelting operation, involves a multitude of chemical reactions taking place between the iron, carbon, manganese of the raw materials, the carbon and silicon of the crucible material and the different slags formed at the various stages of the melting.

Most of these reactions vary in degree when the same crucible is used repeatedly, therefore absolute uniformity of the product can only be depended upon when crucibles are used but once. In order to be able to fulfill this great desideratum and furthermore to have absolute control over the chemical composition of the different kinds of crucibles employed for the various qualities of tool and special steel, the Kapfenberg works include a crucible factory on the premises.

Only very pure graphite can be used for the purpose: when containing impurities to any extent it has to undergo a special purifying treatment. Styrian graphite as used for crucibles contains on an average:

C	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	P ₂ O ₅	K ₂ O	H ₂ O
77.80	13.04	6.12	0.44	0.01	0.43	1.95 per ct.

The refractory clay is dried in spacious sheds, then crushed by electrically driven grinding mills, and in the state of a fine dry powder conveyed by means of elevators to the storerooms. Suitable amounts of these materials are then taken through rotating mixers and worked into a paste in a battery of troughs and the plastic mass fed into a set of squeezers. Every squeezer supplies the material for a pair of double acting shaping presses from which the crucibles emerge in their final form. The crucible factory has a capacity of from 12,000 to 15,000 crucibles per week, while the drying houses hold 50,000 to 70,000 of them. Careful and gradual drying is indispensable, the crucibles are therefore kept slowly traveling through the drying houses, being shifted at certain intervals from cooler to hotter and drier sections, the entire trip taking six to seven weeks.

The second characteristic feature and perhaps the main cause of the excellence of Styrian steel may be found in the extremely pure ores of the Erzberg, that is, Ore Mountain. The view shown in Fig. 1 gives an idea of a small section only. The giant steps or terraces shown go up to the height of 5000 ft., and the whole conical mountain of that peculiar reddish iron ore tint, surrounded by wood clad and snow topped mountains reaching 6000 ft. and more, really presents an imposing appearance. Besides being of so great an historical and metallurgical interest, the Erzberg is in fact one of the sights of the Alps. Erzberg ore is almost entirely free from noxious impurities; crude ore yields 38 per cent. to 40 per cent., roasted ore as much as 52 per cent. of iron. Analysis made by the Austrian Government Assay Office average for the crude ore

Fe = 38.9 per cent.
Mn = 2.1 per cent.
P = 0.017 per cent.
S = traces.
Cu = traces.

* Read before the New York Academy of Sciences, Section of Astronomy, Physics and Chemistry, and reprinted from the School of Mines Quarterly of Columbia University.

At the base of the mountain very silicious ores are found that are smelted in coke blast furnaces, while the higher regions consist of ores low in silica, as given in Table I.

Table I.—Analysis of Erzberg Ore.

	From mountain base.		From mountain top.	
FeO	55	53	51	55
Fe ₂ O ₃	2	3	4	3
MnO	16	10	..	..
SiO ₂	24	26	37	40
CO ₂	3	8	8	2
MgO				
CaO				
&c.				

Styrian Charcoal Furnace Practice.

While the working of Erzberg is uniform and carried on for common account by the Austrian Alpine Mining Company, the smelting in the charcoal blast furnaces at Vordernberg is under the management of the various owners. The one controlled by the Kapfenberg works is shown in Fig. 2. They all look very much like this one, reminding one of a medieval castle rather than of a sky-scraping coke blast furnace. Also, they do not produce quantity but quality.

Table II.—Comparison of Blast Furnace Practice.

	Pounds of charcoal burned per ton of iron produced.	
	White iron.	Gray iron.
In Styria.....	1,300	1,500
In Sweden.....	1,850	2,050
In United States.....	1,640 to 1,800	2,400

The hight of Styrian charcoal blast furnaces varies between 40 and 50 ft., their throat diameter ranges from 3½ to 6½ ft., their bosh diameter from 6½ to 11 ft.; the output in 24 hr. amounts from 20 to 60 tons. The ratio of fuel to burden varies from 1.3 to 1.3½ as compared with the ratios of 1.2 to 1.2½ in general Swedish practice (low figures for gray, high figures for white iron). This is due to the fact that the Styrian siderite is easily reduced, and that owing to its peculiar composition only a small quantity of flux is needed. For the same reasons the amount of fuel burned per ton of iron produced compares favorably with the figures for American and Swedish practice (see Table II.).

Typical analyses of Styrian charcoal pig iron are shown in Table III.

Table III.—Analysis of Styrian Charcoal Pig Iron (Lederbur).

	Gray.	Mottled.	White.
C	3.78	3.01	3.72
Graphite	3.07	2.26	...
Mn	2.52	2.33	0.69
Si	1.35	1.79	0.12
S	0.05	0.03	0.02
P	0.03	0.04	0.07
Cu, Co, Ni.....	0.11	0.05	...

Because of the easy combustion of charcoal the blast is kept at a lower pressure and a lower temperature than is customary in the case of coke. With coke the larger amounts of ashes contained in the fuel and the chemical nature of these ashes make a greater quantity of flux necessary, and the slag thus formed has a melting point superior to the temperatures generally reached in charcoal blast furnaces. At the low temperatures of the latter the metal is less liable to absorb S, As, Sb, Cu, Ti, &c., and this fact, togther with the initial purity of the fuel, results in the greater purity of the product.

Charcoal Refineries Used.

The pig iron is converted into steel in the charcoal refinery, and this extensive use of charcoal may be considered another special feature of Styrian steelmaking. The refining process is a costly one, as one may judge by the time it takes; to convert a given quantity of pig iron into steel it takes as many days on the charcoal hearth as it takes hours in the puddling furnace and minutes in the Bessemer converter. Nevertheless this ancient way of refining has been maintained; for the production of a high carbon steel, chemically pure so to speak, is more to be depended upon by this process than by any other.

The oldest apparatus and the one still in common use is the finery fire or hearth. It is a flat pit lined on all four sides with iron plates, above one of which is placed, slanting downward, the tuyere for conducting the blast. The pit having first been filled with charcoal, the pig iron is placed on it and melted down by the blast.

The chemical reactions underlying the operation are different in character from the other methods of decarburization technically employed. With gray pig iron the process is carried out in three stages bearing different names. In the first, called "fining," silicon is oxidized into sillicic acid, the greatest part of the manganese and part of the carbon. In this way gray iron is converted into white. The second stage, the "crude refining" involves further oxidation of the carbon partly by the direct action in the air, partly by the indirect action of the oxides contained in the slag. At the end of the second stage the material has acquired the qualities of steel. Finally the third stage, called "complete refining," consists in the oxidation of the remainder of the carbon, that is to say, in the conversion of steel into wrought iron. Consequently if gray pig iron be used for making wrought iron, the material must be melted down three times, while in the case of white iron the first fining is dispensed with and two meltings suffice. For the production of steel complete refining is not required and two meltings are



Fig. 1.—The Erzberg or Ore Mountain in Styria.

sufficient in the case of gray iron, or only one in the case of white iron.

On an average the charcoal hearth steel is composed of:

C = 0.800 to 1.300 per cent.
Mn = 0.043 per cent.
Si = 0.020 per cent.
S = 0.005 per cent.
P = 0.015 to 0.019 per cent.
Cu = 0.004 per cent.
Co = traces.
Ni = traces.

This analysis shows that if the carbon be deducted all the other impurities taken together amount to 0.087 to 0.091 per cent., half of which is manganese. Refined steel is therefore superior in chemical purity to any other kind of raw steel and forms the first and most valuable raw material for the manufacture of Styrian crucible steel.

In the second place puddled steel is used as a further raw material, mostly in connection with refined steel. It is made from the same charcoal pig iron in puddling furnaces of a special kind with a slight charge. By this method, however, it is not possible to produce steel of such chemical purity as by the finery process, owing to the higher temperatures of the gas furnaces, the greater rapidity of the reactions, and the difficulty of regulating the temperatures at the various stages of the process.

The melting takes from 3 to 4 hr.; its progress is tested by the foreman with a search iron. The chemical reactions now taking place in the interior of the crucibles build up one of the most complex problems of scientific metallurgy. Certain amounts of iron oxide are inevitably brought into the crucible on the surface of the pieces of raw steel and pig iron, and also by the slag contained in the weld steel. Moreover, there is air in the spaces between the material. On melting, the oxides present and those formed under the influence of the inclosed air first form an oxidizing slag, rich in iron, that acts upon the carbon content of the bath. Carbon monoxide is formed and produces a slight boil. If the crucibles are poor in graphite, a decrease in carbon can thus take place during this first period of the process; if, however, the crucibles contain a considerable amount of graphite, no loss of carbon will be noticed in the steel.

During the following period of the melting the slag gradually grows poorer in iron. This is partly due to the carbon in the steel and in the crucible material now acting upon the Fe_2O_3 contained in the slag, partly to the dissolving of crucible material bringing about an increase of the total quantity of slag. The slag by and by loses its oxidizing influence and the graphite laid bare by the dissolving of the crucible wall is absorbed by the steel.



Fig. 2.—The Kapfenberg Charcoal Blast Furnace in Styria.

To produce the softest kinds of crucible steel, ingot iron must be used. It is made from charcoal pig iron in a small basic open hearth furnace specially designed for the purpose and yielding a product of extreme purity.

These products then, charcoal pig iron and the materials derived from it in the different ways described above (together with tungsten, chromium, molybdenum, nickel, vanadium, tantalum, uranium, &c., or their alloys in the case of special steels), form the raw materials for the manufacture of Styrian tool steel. In carefully calculated proportions they are charged into the preheated crucibles as will be seen presently.

The Modern Styrian Crucible Furnace.

Different from the type in use in this country, the modern Styrian crucible furnace is of the overground pattern, allowing an easy handling of the crucibles by means of suspended tongs. One furnace holds 40 to 50 crucibles, the object of limiting the number being to insure uniformity of temperature which could not so well be obtained if the furnace were built to hold more. The furnaces are fitted with Siemens regenerators and have a forewarming pit with two separate compartments kept at 400 degrees and 800 degrees C., respectively. The empty crucibles are placed in the first compartment, and after remaining there for 4 hr. they are filled with the raw materials and transferred to the second chamber for another period of 4 hr. They are finally shifted red hot into the melting furnace.

At the same time the silicon of the clay is reduced and conveyed into the bath.

The temperature is of great influence on these reactions and so is the presence of manganese. The rôle of the latter is particularly complicated. It makes a great difference whether the manganese is contained in the raw materials or added as Mn_2O_3 and at what stage of the process the addition is made.

As to the last stage, the "killing" and the nature of the changes taking place during that time, the views of the different authorities do not coincide. The general belief is that the killing may be due merely to the evolution of gases. It is more likely, however, that killing chiefly acts through enabling the metal to absorb further silicon from the walls of the crucible, thus increasing its solvent power for gas* and thus enabling it to retain in solution during solidification the gas which it contains when molten. When this stage has been reached, the foreman operating the charge will give the signal for the teeming. Such slight differences of temperature as should happen to exist between the different crucibles are equalized by uniting the 40 crucibles of one charge in a ladle previously heated, from the bottom of which the steel is cast into iron molds.

The Care Taken to Secure Good Ingots.

By a special device in the form of a collar of refractory material the pipe due to shrinkage is localized at the

* Howe, "Metallurgy of Steel," p. 304.

very top of the ingot and entirely removed. Every ingot is tested as to physical homogeneity, grain structure and purity of surface, flaws being carefully removed by emery wheels or pneumatic chisels, before the ingot is taken to the hammer plant or rolling mill. The latter, electrically driven, does quick work and heavy hydraulic presses are in operation for certain purposes, but the greatest part of Styrian tool steel is hammer forged. Again, this process is slow and costly, but the best kneading of the material and thus its finest grain is obtained by it. Such hammer forging, with the heat treatment and proper manipulation in general, appears to be of greater influence on the final quality of high class tool steel than is often thought to be the case. It requires particular care, a skilled eye and a trained hand, and may in fact be called an art. Now in the course of centuries of intimate acquaintance with tool steel, generations of workmen have arisen in the Styrian Alps with whom this art has become second nature.

In consequence of all of this, Styrian steel will be met with everywhere. Besides all kind of tools it is used for scores of other purposes in which highest quality is the main requirement; army rifles, armor piercing shells, shrapnels and shotproof screens are now made of it, and so are the vital parts of recoil field guns, motor cars, steam turbines, &c.

Even in America, in the world's greatest of ironmaking

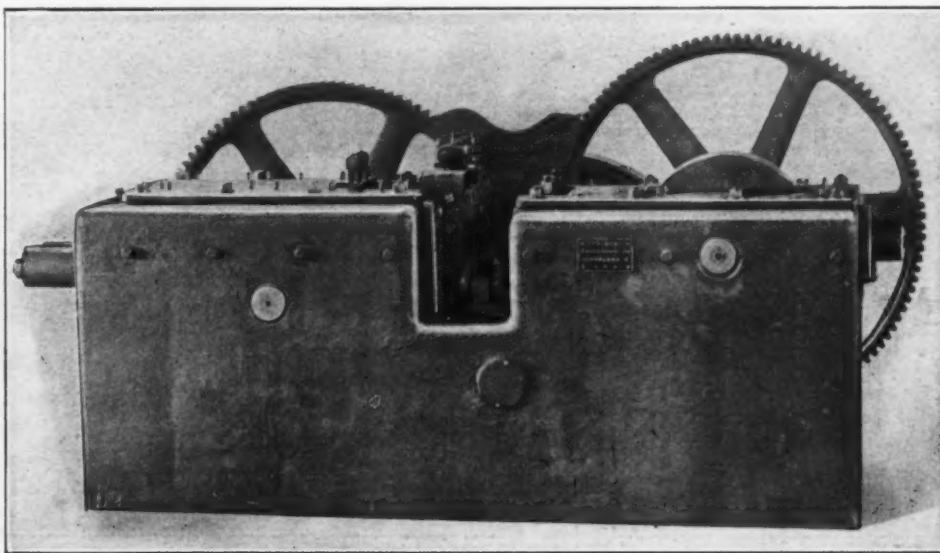
course in event of disobedience being for the commission to certify the facts to the Secretary of Internal Affairs, charged with supervision of the railroads by the constitution of the State, and the Attorney-General for prosecution. The commission, however, takes the position that the order is necessary for public safety and expects it to be followed. A committee of managers of companies has been received by the commission and agreed to put the order into effect.

The commission is now acting upon complaints relative to shipping and other details of railroad operation and will announce a number of decisions shortly. It has now got into full working order, an elaborate system and organization having been perfected.

A New Acme Hot Pressed Nut Machine.

The accompanying illustration shows the features of a line of hot pressed nut machines recently placed on the market by the Acme Machinery Company, Cleveland, Ohio, for making nuts by the hot pressed process. This machine has been especially designed for rapid work production and low cost for repairs.

The bed is a single steel casting four times as strong as an iron bed of the same weight. The gears are steel castings with cut teeth. The cutter slide, crowner slide and piercer slide are steel castings. The linings are hard-



A New Hot Pressed Nut Machine, Built by the Acme Machinery Company, Cleveland, Ohio.

and iron using countries, Styrian steel is used to a large extent, being found in the workshops of a number of the largest railroads and imported on a large scale for the United States Army Ordnance Department and other important concerns.

The Pennsylvania Railroad Commission.

HARRISBURG, PA., November 2, 1908.—Pennsylvania's new State Railroad Commission has issued its first regulation, directing that after November 15 the street railroad companies of the State prohibit riding on the front platforms of closed cars and that all riding on open cars be limited to the capacity of the first seat. This order, which was sent to 168 operating companies in the State, was issued as the result of inquiries made into accidents and will be effective no matter what crowds are to be handled. It has caused some discussion in view of the fact that in some of the iron, steel and coal districts the operatives of plants and mines are required to ride outside because their presence in the cars in working clothes might soil the seats or the clothing of passengers and cause claims for damages.

There is also considerable interest in the regulation in that it directs that the order be obeyed when the act creating the commission is held to give it only power to recommend to companies certain lines of action, the re-

ened tool steel, phosphor bronze and cast iron strips, plates and bushings. The operating cams are steel castings with hardened tool steel faces running against hard steel rollers. When the piercer is punching the nut all the rest of the mechanism ceases its motion, so that there is never any pressure on the nut during the moment of piercing, thus lessening the tendency to strip or score the punch or piercer. The bed of the machine is so designed as to contain oil pools into which all the cams dip at every revolution.

The new movements introduced into these machines, together with their great weight and power, make it possible to form steel nuts on them as readily as iron nuts. The machine is made in two sizes. The 1-in. machine weighs about 7 tons, occupies a floor space of 9 ft. 1 in. by 5 ft. 1 in., and requires 7½ hp. for its drive. The 1½ in. machine weighs 10 tons, occupies a floor space of 11 ft. 2 in. by 5 ft. 8 in., and requires about 10 hp.

The rolling mill of the Weller Rolling Mill & Forge Company, Gadsden, Ala., recently operated by the Emery Steel Company, has been leased by the R. C. Forster Company, Birmingham, Ala., which will use the plant to supply billets for its mill in East Birmingham. It is not the intention of the R. C. Forster Company to produce finished bars from the Weller mill at the present time, but when the market will warrant its doing so the company will probably turn out finished bars there.

The Lash Steel Process.*

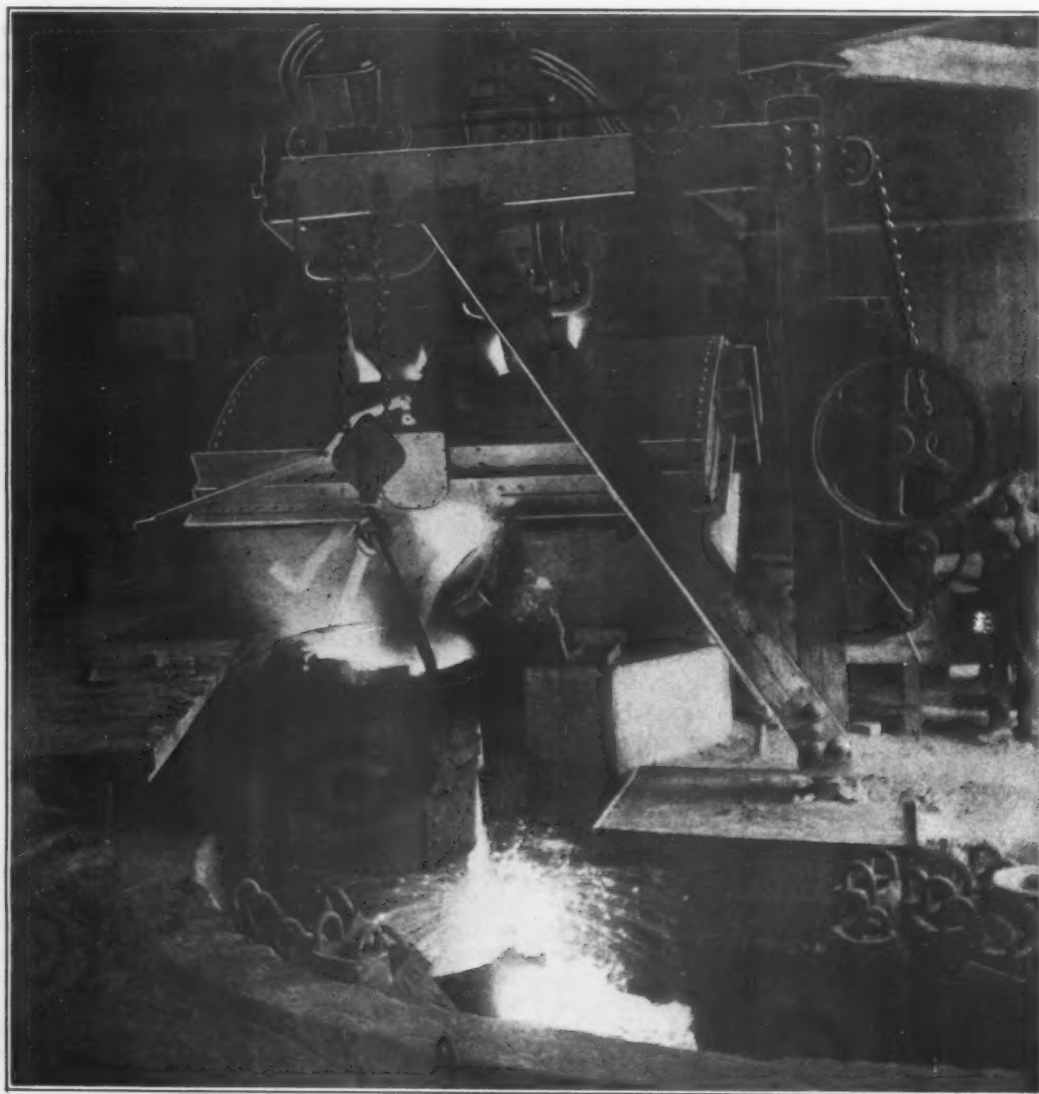
Results Secured with the Heroult Electric Furnace.

BY F. A. J. FITZ GERALD, NIAGARA FALLS, N. Y.

The object of the paper is to describe the Lash process [patented by Horace W. Lash, Cleveland, Ohio, and described in *The Iron Age* of August 8, 1907] and the possibilities of its application to the electric furnace. Discussions which inevitably arise when a metallurgical process of this kind is successful, as to whether a similar method has been tried before, are unprofitable and out of place.

The mixture used in the Lash process consists of finely

in the electric furnace from a mixture of ore and carbon, this being best illustrated by the work of Major Stassano. In the experiments made at Sault Ste. Marie, under the auspices of the Canadian Government, pig iron was produced from ore, the consumption of energy amounting to about 0.28 hp. year per ton; but in the Stassano experiments the energy consumed per ton of steel produced amounted to 0.62 hp. year. If the energy required to produce a ton of steel in the electric furnace could be reduced from the amount required in the Stassano experiments, and brought nearer to the results obtained per ton of pig iron at Sault Ste. Marie, the field of usefulness of the electric furnace in the metallurgy of iron and steel would be very greatly extended. The serious difficulty experienced in most processes for the manufacture of steel direct in the electric furnace is the serious loss of metal in the slag. This, however, was not to be feared



Heroult Furnace as Employed at Niagara Falls, N. Y., in Connection with the Lash Steel Process.

divided ore, coke and iron high in metalloids. The metalloids contained in the cast iron appear to act as reducing agents, and besides this the cast iron appears to act as a carrier of the carbon, so that in the working of the process it may be supposed that carbide of iron (as Fe_3C) acts as a reducer. Besides these main constituents of the mixture lime or other fluxes may be added, sawdust to make the mixture porous, and some suitable binder when it is desired to briquette the mass. The advantage of using the Lash process in the open hearth furnace is due to the greater cheapness of iron in the form of ore than as pig iron, so that other things equal the greater the proportion of iron that may be used in the form of ore the cheaper the process.

It is well known that steel has been directly produced

in the Lash process, as preliminary experiments made in the laboratories of FitzGerald & Bennie showed that the steel obtained from the Lash mixture amounted to 98 per cent. of the iron contained in the charge.

Of the various furnaces which might be used to investigate the working of the Lash process, it was found most convenient to build a 3-ton furnace of the Heroult type. One of these furnaces was built at Niagara Falls under the direction of Robert Turnbull and about 50 tons of steel produced. Chemical and physical tests of some of these steels are as follows:

Chemical Analyses.				
	Heat No. 9.	Heat No. 11.	Heat No. 23.	Heat No. 27.
Carbon	0.10	0.08	0.92	0.22
Manganese	0.75	0.09	0.41	0.94
Phosphorus	0.015	0.015	0.038	0.033
Sulphur	0.070	0.007	0.026	0.056
Silicon	0.02	0.09	0.13	0.03

* Abstract of a paper read at the fourteenth general meeting of the American Electro-Chemical Society, in New York, October 31, 1908.

Physical Tests.

Heat No.	Tensile strength.	Elastic limit.	Elongation. Per cent.	Reduction. Per cent.
9.....	57,000	34,000	33	58
27.....	77,000	45,000	28	56

The physical tests were made from pieces 1 in. square. The elongation was determined in a length of 2 in. The steel of heat No. 27 was treated with 0.1 per cent. of titanium.

In making the steel a great many different experiments were tried, and this changing of conditions, as well as the inadequacy of the apparatus used, prevented the attainment of the highest efficiency. Nevertheless it was found that the Lash mixture could be completely reduced and steel obtained therefrom with a consumption of only 0.27 hp. year per ton. An excessive amount of energy was used in finishing the steel, owing to the inexperience of the men employed; nevertheless, it is believed, from the results of the experiments, that on a commercial scale a production of four tons of steel per horsepower year can be reached.

While trouble was experienced in some of the experiments owing to the rapid wearing away of the electrodes, this objection was overcome to a great extent, and it is believed that this source of expense can be brought down to a reasonable amount. In the Stassano furnace the consumption of electrodes would probably be less than in the Héroult furnace, although it is not possible to say whether the energy consumption would be as low. The electrode problem suggests the advantage of a furnace in which no electrodes are required, like the Colby-Kjellin induction furnace. Unfortunately this furnace is not suitable for the handling of slags which are inevitable in the Lash process, but the modification of this type, known as the Röchling-Rodenhauser furnace should give interesting results, as it has a form which is not open to the objections found in the earlier designs.

Discussion.

In connection with the reading of the paper, Mr. Fitzgerald threw on the screen a view of the Héroult furnace as employed in the experiments at Niagara Falls. It is reproduced herewith. The ingots were bottom cast, the steel being poured from the ladle into the center runner shown at the right of the illustration. The ingots weighed from 200 to 425 lb. A view was also given of the Röchling-Rodenhauser modification of the Colby-Kjellin induction furnace, in which it is the expectation to test the Lash process eventually. The original type of this furnace was only used for refining operations, the narrowness of the channel making it impossible to handle slags. In answer to questions, Mr. Fitzgerald said that at first in the experiments at Niagara Falls it was found that a good deal of iron went into the slag—up to 15 per cent. in some cases. In later runs the loss amounted to 6 per cent. But when the power consumption was brought down lower, the loss of iron in the slag was also much reduced. He showed some excellent cold bending tests of Lash process steel; also one bent bar of steel containing 1-10 of 1 per cent. titanium, in which a fibrous structure was shown, resembling wrought iron, together with laminations. The cast iron used in the furnace at Niagara Falls was in the form of borings or shotted pig iron. The mixture had varied somewhat as to the percentage of ore, but for the most part 60 per cent. iron ore was used, 23 per cent. cast iron, with the remainder made up of fluxes and carbon.

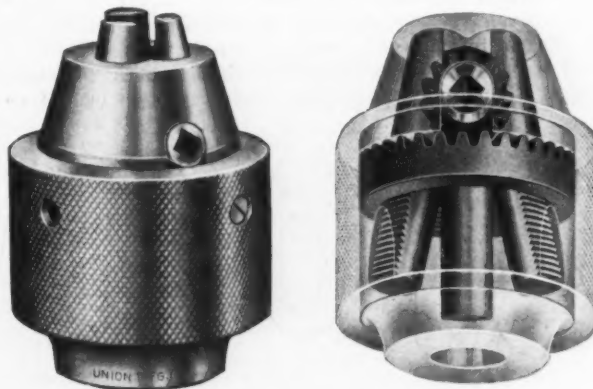
Henry D. Hibbard referred to the great advantage of the electric furnace in the production of heat without oxidation. In the open hearth furnace all the effects are produced by oxygen. It is the great servant of the steel-maker, but it must be fairly well eliminated or it will give all manner of trouble. Yet the drawback about steel production with the electric furnace was the size of the investment required. He found a resemblance between the Lash process and the Uchatius process which was in use in Austria some years ago. It involved a mixture of finely divided iron ore and granulated cast iron, with carbon in some form, but a crucible was employed instead of a furnace.

Prof. J. W. Richards said that the production of steel

involved, first, melting the ingredients, and second, an oxidizing process. The latter is a matter of having sufficient surface to work on, in adding ore for oxidizing the carbon and silicon. Two kinds of furnaces are required for the two operations. Referring to the loss of iron in the slag, he considered it no serious matter. In the open hearth furnace there is considerable loss in this way. In the Monell process it amounts to 15 to 20 per cent., and yet that process is commercially quite successful. In the development of the electric furnace he thought the best results are to be obtained by the co-operation of practical steel men with electro chemists. A great deal has to be learned about steel making, and the electro chemist will avoid many pitfalls by collaborating with an experienced steelmaker.

The Union Geared Drill Chuck.

Exterior and phantom views of a new drill chuck which is about to be placed on the market by the Union Mfg. Company, New Britain, Conn., appear herewith. This chuck is similar in design to the Union Czar drill chuck, which the same company has been making for several years, but in the manner of getting the strongest grip on the drill adds to the older type the principle of a geared drill chuck. Unlike the latter style of chuck as it is usually made, the circular rack is inclosed and is



The New Geared Drill Chuck Made by the Union Mfg. Company, New Britain, Conn.

operated by a contained and inclosed pinion which is not a part of the tightening key. By virtue of the construction the teeth of the pinion are kept always in line with the teeth of the circular rack, which prevents breaking the teeth and also does away with an accumulation of dirt and dust, such as is likely to foul an exposed operating device. It is believed that this form of chuck will prove more satisfactory than one in which the pinion is on the key or the circular rack is exposed. The Union geared drill chuck is made in the same sizes as the Union Czar drill chuck—namely, Nos. 1, 2 and 3, holding respectively 3-16, 5-16 and $\frac{1}{2}$ in drills.

The new plant to be erected by the Crane Company of Chicago at Oakmont, Pittsburgh, is designed to take care of the scattered pipe-bending divisions of the various branches of the company and to concentrate them near the pipe mills. Other work incidental to power plant construction will also be done at the Oakmont plant. The plans for the new works are not completed, being in course of preparation at Chicago.

The widespread prevalence of drouth conditions the past six months promises to have some influence on the cast iron pipe trade. In many cities and towns the absolute necessity of larger water power plants has been sharply demonstrated. Chicago advices state that a large number of municipalities are now figuring on selling securities with a view to increasing their water facilities.

Chains and Chain Making.*

BY JAMES H. BAKER.

Early History.

Just when chains were first made is uncertain, because the word has meant almost any kind of connection. Thousands of years ago rings of metal were made and fastened to cloth, thus making chain armor. Later rings were joined together by other metal rings, and this was the first metal chain. Apparently chains were used more as ornaments than anything else up to about 125 years ago, although occasional patents were issued during the past 275 years. The first patent the author has knowledge of was issued in England in 1634 and described as follows:

"A Way for the Mearing of Shipps with Iron Chaynes by finding out the True Heating, Ppaeing and Temping of Iyron for that Ppose, and that he hath nowe attayned to the True Use of the said Chaynes and that the same wilbe for the great saveing of cordage and Safety of Shipps, and will redound to the Good of our Common Wealth."

In 1690 a British admiral recommended the use of chain moorings, but not until 100 years ago were chains used as ships' cables. (The original meaning of "cable" was "capable.") For nearly 100 years more there was no progress. Almost all conceivable forms of chain were brought out between 1790 and 1820. Many machines were invented later for making the different kinds of chain, but in this country nearly all the welded chain is still made either by hand or under simple power hammers. There has been quite a development in wire wound or

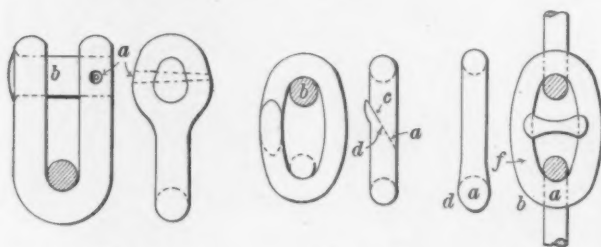


FIG. 1

FIG. 2

FIG. 3

weldless chains, and electric welding has made progress within the last 25 years, but both these methods so far have only been successful in light chains. Wire wound chains hardly run over $\frac{1}{4}$ in. and electrically welded not over $\frac{1}{2}$ in.

In 1783 a patent was issued in England for making chain by casting link after link into one another, and annealing the chain when done. Later this was tried under improved conditions in France, but has not succeeded. Another patent, in 1791, covered a combination of metal and leather to prevent noise and give elasticity, probably because hempen cables were noiseless and would stretch and recover a great deal. Iron chains were objected to because they would not stretch. In 1808 the first chain was put on a vessel as a cable and then numerous patents in England followed quickly. The one that probably had the most to do with furthering the use of chain cables was granted in 1808 to Samuel Brown for swivels and shackles. Shackles met the greatest objection to iron cables, which was that they could not be quickly parted, while a hempen cable could easily be cut. A shackle such as the one in Fig. 1 has a tapered pin *a*, which is easily removed, and then the bolt *b* can be driven out. The form of shackle first patented has scarcely changed since. All shackles, rings, hooks, end links, &c., should be heavier than the body of the chain, often much heavier. The shackle shown is a joining shackle. End or anchor shackles were and are larger.

To simulate the stretch of hempen cables twisted links with studs in them were patented, and it was claimed that a cable of these would stretch and recover 8 or 10 ft., but these never came into general use.

* From a paper presented before the Engineers' Society of Western Pennsylvania.

English Progress.

* Side welding, while practiced somewhat, did not become prominent until about 1840, and became more so as sizes increased. It has fallen into disrepute with the United States Government, probably due to the method by which side welds are made. Fig. 2 shows a link of which one-half of the lap at *a* has been welded. The link *b* in this link is then shifted to the other end and the remaining part of the lap, *c*, welded. When, as is likely, slag is imprisoned at *d*, a good weld is not made, and the larger the diameter the more difficult it is to expel this slag by hand working. Moreover, the large links

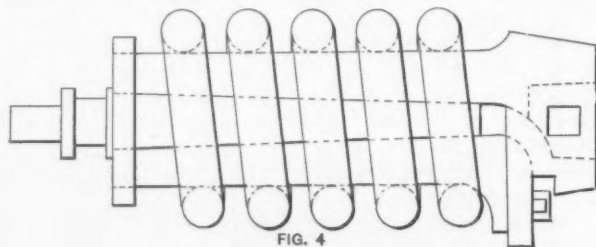


FIG. 4

are hard to heat properly with the cold link *b* in such close proximity. Stud chain in the largest sizes, if made, as it should be, by proper machinery, would unquestionably be the best as well as the cheapest, and no doubt such machinery can be devised. The only end welded chain comparable to a good side welded article is hand welded, and that is expensive.

In 1813 stud chain, Fig. 3, was patented, and seems to be the last English patent of much consequence, though many efforts were made there in the next 10 years to improve chain. Studs were welded in the links, but these, too, soon passed away. Studs have been mostly of cast iron, but our Government now uses drop forged studs and demands that the grooves for the links be milled. During this time close link chain—that is, unstudded—kept pace in the manner of making, and in the improvement of the iron for it, but less has been said about close link chain, as the interest largely centered in ship's cables. Nearly all improvements as to forms of welded chain were made in England, but this country has made great progress in the direction of increasing production and stands abreast of any country in the matter of fine material for chains. At *a*, Fig. 3, is shown a crown at the weld, which all fine end welded links have, and this swell is often also sidewise, as at *d*; but, even with the crown, the links will be weak at the point where the ends of the laps come, indicated by *b*. The best end welded links have the ends of the laps carried well on the sides, or about to *f*.

In 1811 an English patent was granted for winding rods into a spiral and cutting the links from it.† Fig. 4 shows a device which was operated by hand, taking the rod hot as it came from the rolls.

Fig. 5 shows a blank of half round section, the two halves of which are welded together, with their end

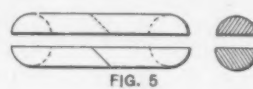


FIG. 5



FIG. 6

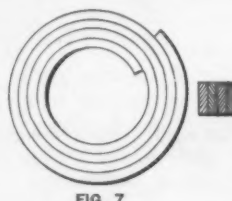


FIG. 7

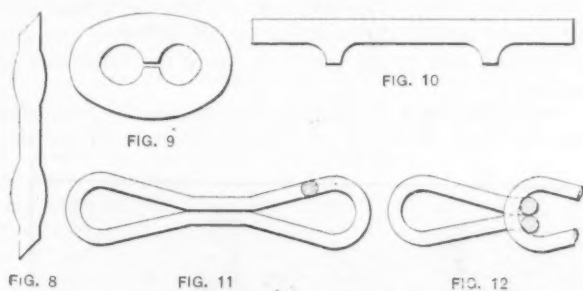
welds diametrically opposite. Fig. 6 shows a blank of square bar bent three times around and welded. Fig. 7 shows a Belgian method. This compound winding and welding at the same heat has the objection of necessitating the links to be of too great length for many purposes.

An English patent in 1812 was for link blanks, Fig. 8, forged with heavy parts to form the ends of the links. Figs. 9 and 10 show an effort to form the studs integral

* From "Chain Cables and Chains," by Thomas W. Trail. Crosby, Lockwood & Co., London.

† Of interest in this connection is an article on "The Manufacture of Chain," by L. B. Powell, in *The Iron Age*, January 5, 1905.

with the links. Figs. 11 and 12 show links welded and looped. This is probably one of the oldest forms of chain, though at first the links were not welded. Fig. 13 shows how, about 80 years ago, link stock was rolled so as to give extra strength at the welds. This was rolled in the usual way to the size of the large part, then passed through an extra set of rolls to reduce the intermediate parts, and then cut at an angle white hot. Fig. 14 shows a plan for making links from a solid bar, cut at an angle, after punching out the central portions *c, c*, and finally bending and welding together *a* and *a'* and *b* and *b'*. This plan has been elaborately tried in other forms.



such as star sections. All the above ideas except the Belgian and the intermediate rolling were brought out within about 14 years after the introduction of the first iron cable in 1808.

American Progress.

It seems strange that the largest chain of any length ever produced in this country was made about 130 years ago, when there were no rolling mills or steam hammers used here. It was 500 yards long and the links were made of $3\frac{1}{2}$ in. square stock, with the corners slightly rounded. Each link weighed about 275 lb. This chain cost the Colonies over \$2000 per ton and was made to keep British ships from ascending the upper Hudson River. The contract was given in the evening and work on it commenced next morning at Sterling, about 20 miles back of West Point, N. Y. It was shipped in lengths of eight links each on ox carts and joined at the river. There were seven welding and 10 forging fires at work on it. When finished it was held at the desired height in the river by logs and bolted together. Notwithstanding all the English enterprise later, it was nearly 50 years after the production of this large chain before that country made a chain as large as $1\frac{1}{2}$ in., and it seems that this country has not made as large chain since.

There is not much on record concerning chain making in this country. Little chain was made in factories here until about the time of the Civil War. A ship's cable chain works was established about 1835 or 1840 in Boston, and in 1865 the Carr Chain Works was incorporated at Troy, N. Y., and became quite a factor, especially in the making of fine chains. This company is believed to have been in some way connected with the Burden Iron Works. About the same time A. Hewitt & Co. established a works in Trenton, N. J., which also made much progress. One among the earliest was the Hayden Chain Works, at Columbus, Ohio, which started by making harness and saddlery chains and finally made high class crane chains and had much to do with displacing English chain in this country. Even up to 20 years ago English chain still had a hold here, one brand, the Lord Ward, being very popular for certain work. Pittsburgh to-day is the largest producer of chains in the country, the principal works being the James McKay Company, Jones & Laughlin and the Standard Chain Company. In the last named company the Baker Chain Works was merged. Pittsburgh not only stands first in production, but it is at the head in fine chain material in both iron and steel.

Many curious and some very ingenious machines have been invented for making welded chain, such as those for making it automatically from the straight rod, &c. A large number of chain patents have been issued in this country, but the great bulk of all chain made here is hand welded, such as crane chains, and about all chains from $1\frac{1}{4}$ in. in diameter up, or if not strictly hand welded, nearly so. Most smaller chain of the usual

quality is made by coiling the links, cutting them at an angle and welding in dies. At first the hammers carrying the dies were generally operated by foot, but more and more these are being operated by power, even down to quite light chains. Men become very expert, and a proficient man or boy can cut 250 light links per minute. They are wound at a very rapid rate, and an expert can weld 500 links per hour of light chain. Heating for all such work is usually done in flat top furnaces, the links being suspended through holes in the tops of the furnace and held by rods with hooks on their ends. Usually a boy places the links on the hooks and puts them into the furnace, and the chain maker takes each link from the furnace, threads it into the chain and places it in the dies, turning it once or twice while welding.

Electrically Welded Chain.

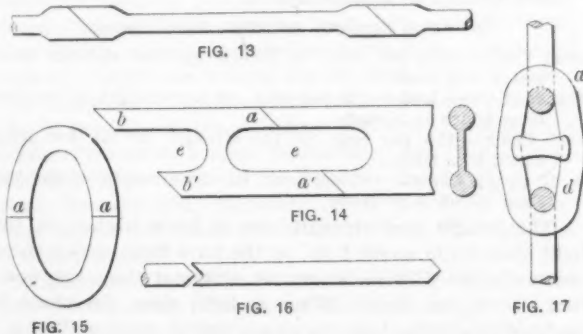
Electric welding of chain was first tried about a quarter of a century ago by taking two half links, Fig. 15, and joining them at *a a*. Links as large as 3 in. diameter of stock have been made by this process, but it seems it had to be abandoned for large chain. Recently electrically welded chain up to $\frac{1}{2}$ or $\frac{5}{8}$ in. has been made commercially by automatically cutting the blanks from a bar so as to form a socket in one end and a corresponding taper on the other end of the link blank, Fig. 16. This is then bent and joined on one side and these joints welded. This obviates the usual amount of upset in such cases. The laps, or area of contact is much larger than in the squarely cut ends, and a nice appearing and good weld is made.

Weldless Chains.

Weldless chains have greater strength in the small sizes, say, below $\frac{1}{4}$ in. than welded chains, because the wire from which they are made, being cold drawn, has a much greater strength than rod steel; the smaller the chain the more difficult it is to make a weld which will be as strong as the rod from which the link is made.

Nomenclature.

The chains of commerce have as many names as the uses to which they are put. Proof chain is such as has been pulled in a testing machine up to a certain strain. This is usually somewhat below one-half of the load it should take to break the chain. B chain is an abbreviation of "best"; competition resulted in B B (Best, Best) and later B B B (three B), so that now hardly any one speaks of one B chain. Well made chain of Swedish iron when pulled to the breaking point is stiff enough for a walking stick, caused by the links closing in on each other sidewise. Dredge chain is the same as three B, but should have special attention paid to the hardness of its stock to stand wear in sand and dirt. Steel chain resembles Swedish iron chain in extreme elongation. Nearly all common chain is now made of steel, and a good deal of chain above common is also made of this material and is giving satisfactory service. But for particular



purposes, especially where great safety and resistance to wear are required, special iron is keeping first place. All welded chain manufacturers make some iron chain.

Wear.

The greater the number of links in a given length the longer the chain will wear, for the greater the angle at which the links play in each other the faster the wear. Therefore, a chain will wear, sometimes more than double as fast in one part as in another. For instance, the old style tongue chain on wagons wore much faster next to the tongue than at the horse's collar. Breast chains

wore faster in the center than at the ends next to the horse's shoulder. It used to be the custom to make these chains with heavier parts accordingly.

Chains used in critical places should be annealed at times. The principal need for this arises from a strain sufficient to bend the links, as this bending being really "cold work" on the material hardens it. If certain that a chain has had no strain over, say, one-quarter of its proof strength, or one-eighth of its breaking load, then there is little occasion for annealing. But if a chain has been strained well up to its breaking strength it should be annealed, if that is every day. Of course, there is no sense in using a chain to this limit except in dire need.

Reliability.

Much depends on the honesty both of the manufacturer and the chain maker. Honesty in the manufacturer has an influence on his workmen, because he will endeavor to keep as honest men as he can find for making chains, which are intended for work which would be dangerous without such care. This may seem a platitude, but the preference should be given always to men who have the best character for honesty. A good chain maker knows when he is making a doubtful weld. Chains are generally proved, but while this is important proving does not tell all the story. Users should understand that they should not expect common chain, which has a wide and useful field of its own, to equal the higher class product needed for certain purposes.

All manufacturers give tables on chain; Trall already referred to gives a most complete collection of tables. They are, therefore, omitted here, but some rules that have been deduced by the author and found useful are given below. From the nature of the case figures as to the strength of chain can only be given approximately:

Dimensions of Links.

- Stud Chain.**—Maximum length inside, four diameters of the bar from which it is made. Maximum width inside, 60 per cent. of inside maximum length.
- Standard Close Link.**—Maximum length inside, three diameters of the bar from which it is made. Maximum width inside, 70 per cent. of maximum length inside.
- Coll Chain.**—This generally runs about like close link, but if anything somewhat longer in the links.
- Crane Chain.**—Length inside, $2\frac{1}{2}$ times the diameter of the bar from which it is made, but it varies a good deal. However, as a rule the shorter the link the better. (Allowable variations under maximum dimensions may not be over 4 per cent. and should not be more than 2 per cent.)

Weights.

- Stud Chain.**— $3\frac{1}{4}$ times the weight of the bar from which it is made. (This includes the stud, it being equalized by the extra length of link.)
- Standard Close Link.**— $3\frac{1}{4}$ times the weight of the bar from which it is made.
- Coll Chain.**— $3\frac{1}{2}$ times the weight of the bar from which it is made.
- Crane Chain.**—4 times the weight of the bar from which it is made. (This extra weight is due to the links being somewhat shorter and to the crowns on the welded links being heavier than on common links.)

Breaking Strength for Well Made Chain.

- Stud Chain.**—165 per cent. of the strength of the bar from which it is made.
- Standard Close Link.**—138 per cent. of the strength of the bar from which it is made.
- Coll Chain.**—120 per cent. of the strength of the bar from which it is made.
- B. B. Crane Chain.**—145 per cent. of the strength of the bar from which it is made.

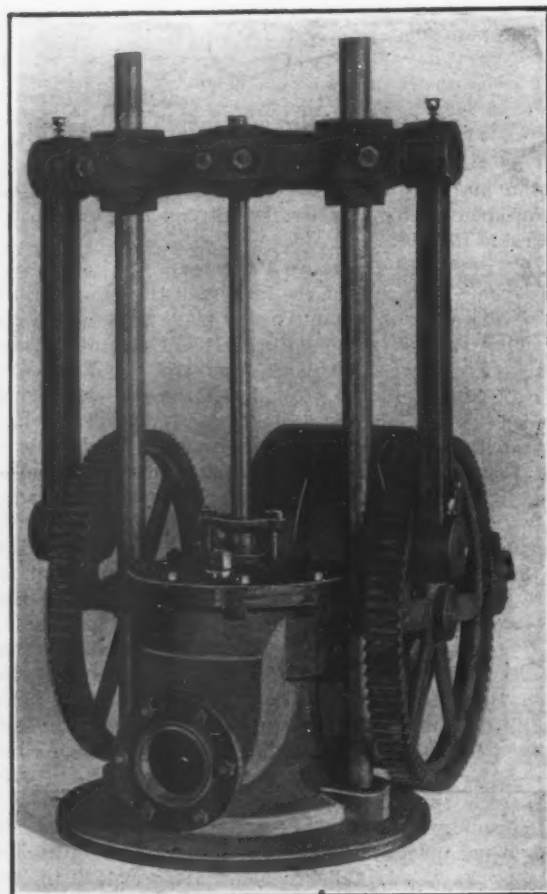
The weight and strength run a little higher on the light sizes up to about 1 in., as the bars from which these are made are 1.32 in. larger in diameter than the nominal size of the chain. When in light sizes, the chain is made of exact size bars the chain size is given as "neat." Ordinary, or die chain, from $\frac{1}{4}$ in. down, becomes further and further lowered in strength compared with the bar as the sizes become smaller, hence the greater strength of weldless chains in the very small sizes.

Fig. 17 shows how the sides of the links straighten at *d*; and, therefore, bend at *a*, when the chain has been loaded sufficiently to distort the links and explains why links will not stand double the load of the bar, because while the metal is stretching generally, the stretch is very much greater in the outer line at the quarter, and added to this is the fact that the ends of the laps end about at this point.

A New Myers Bulldozer Working Head.

Strength, simplicity and accessibility were aimed at in the improved form of bulldozer power working head for deep well pumping, now being introduced by F. E. Myers & Bro., Ashland, Ohio. As in earlier forms of Myers heads the power is applied close to the base, and the construction is such that all the working parts may be removed without disturbing the position of the base or the belt. In addition the new head does not require breaking the discharge line. The power is transmitted directly from the belt pulley through two sets of gears to the piston rod. The side rods are almost in line with the piston rod on the working stroke, relieving the machine from side strain and decreasing the likelihood of breakage.

The cross head is made in halves, and by removing the four bolts shown in the illustration it, with the side



A New Power Working Head for Deep Well Pumping, Made by F. E. Myers & Bro., Ashland, Ohio.

arms, may be laid back on the belt pulleys, permitting the piston rod and plunger to be drawn up through the head of the pump without disturbing the belt or pipe connections. The cross head guides are steel shafts, supported by lugs at the top and bottom of the base. The gears and pinions are of coarse pitch and wide face. The wrist pins are of steel and are riveted into the gear wheels. All bearings are large; the pinion boxes are babbitted and the wrist pins and cross head bearings have removable brass bushings. The suction pipe is supported on a separate collar placed directly under the stuffing box cap, and is easily reached by removing the latter.

The working head illustrated is designed for a 24-in. stroke, and will take a suction pipe up to 8 in. diameter and a discharge pipe up to 6 in. diameter. It is fitted with 6 x 30 in. tight and loose pulleys.

William Farris & Brothers, bridge engineers and contractors, Diamond Bank Building, Pittsburgh, have recently closed contracts for a new warehouse and mill building for the Deal Brothers Milling Company, Cumberland, Md., and several highway bridges in West Virginia, among them a 300-ft. span in Hampshire County.

The Billings & Spencer Improved Trimmer Miller.

The trimmer miller, Fig. 1, is a new type embodying a number of improvements developed from the experience of its builder, the Billings & Spencer Company, Hartford, Conn., in making trimming dies for use in its forge shop. The special purpose of the machine is the finishing of trimming and punching dies for forgings and sheet metal work. In the making of a die the opening is first drilled out, following the general line of the pattern, which leaves a rough, scalloped surface. The trimmer miller finishes the opening to line and also gives to it the necessary relief or clearance. The angle of the cutter determines the degree of relief. To insure good work the cutter must be rigid, and the design of the machine is based upon this necessary consideration.

The inverted spindle holding the cutter is placed in an opening in the center of a heavy universal carriage, operated in the usual way by hand wheels from two sides, the operator standing at the corner between them, one hand on each. He is thus able to guide the work to the cutter at will. The design of the spindle, with its collet and hand wheel, is new. The collet *a*, Fig. 2, is of unusual pattern. Though of the common spring type the angle of its taper is very much less than usual. At its base is tapped a thread into which screws the drawback rod *b*, at the lower end of which is the hand wheel *c*. This design is such that the action of the wheel not only serves to draw the collet down, binding the cutter securely, but in the reverse direction forces out the collet, releasing the cutter. This latter function of the rod is especially necessary because of the long taper of the collet, which is very different from the obtuse angle used in the usual construction. The designers of the machine discarded the obtuse angle on the theory that it may develop a decided tendency to let the cutter work loose. Consequently the long angle was adopted with the drawback rod mechanism to operate it easily and practically. Another feature of the spindle is the means of taking up wear through the taper bronze bushing *d*, which permits the overcoming of the tendency of the spindle to work loose in its bearings. The oiling arrangement is also interesting. At the base of the collet is the

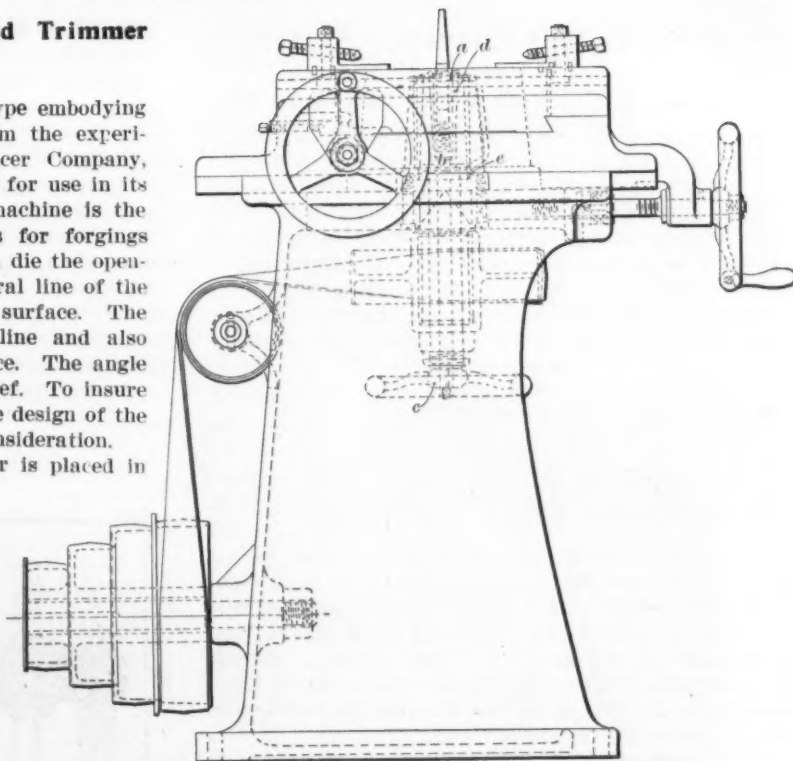


Fig. 2.—Elevation of the Billings & Spencer Improved Trimmer Miller.

oil reservoir *e*, from which a spiral groove encircles the spindle. The revolving of the spindle works the oil to the top, where an oil groove keeps it from overflowing.

The work is held in a chuck or vice as shown. Keyways are cut in the table, corresponding to keyways in the jaws or bunters, so that by removing keys the bunters may be moved in or out from the cutter to correspond to the size of the work. Each bunter has a shelf extending toward the cutter for work to rest on when it is so small as to come within the area of the open space about the cutter. The maximum capacity between the jaws is 16 in. wide and any length. The travel of the table is 5 in. in one direction and 12 in. in the other.

Collets are furnished of the following sizes: $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ in. The cutter speeds are 210, 350 and 580 rev. per min., and are afforded by a three-step cone driving pulley. The weight with the countershaft ready for shipment is 1600 lb. The floor dimensions are 40 x 45 in.

Benson Mines Development.

The Benson iron mines in St. Lawrence County, N. Y., which passed some time ago into the hands of well-known Eastern pig iron producers, will be more extensively worked in the near future. The Benson Mines Company acquired the property in the latter part of 1906, and operated it on a moderate scale through a portion of last year. Later, the leading stockholders—John C. Eden, A. W. Thompson, Wayne Wills and others—disposed of their interests, and the company has now the following officers: President, August Heckscher, New York; vice-president, T. I. Crane, Philadelphia; treasurer, W. A. Pilling, Philadelphia; secretary, F. A. Berthold, 43 Exchange place, New York. Pilling & Crane, Philadelphia, are selling agents.

It has been decided to build a nodulizing plant at the mines, with several rotary kilns having a capacity of 150 tons each a day. The coarser ore will be shipped as mined, as heretofore, and the finer concentrates will be converted into nodules. The present capacity of the concentrating plant is 500 to 700 tons a day, though it has not been operated thus far at this rate. In mining two heavy steam shovels are employed. The average metallic iron content of the magnetic ores at Benson mines is 33 per cent. Concentrates from this ore finer than 50 mesh, have analyzed 64.18 per cent. iron, 1.58 per cent. manganese, 0.461 per cent. sulphur and 0.037 per cent. phosphorus. The phosphorus varies from 0.025 to 0.05 per cent. The nodulizing process brings the sulphur below the percentage noted.

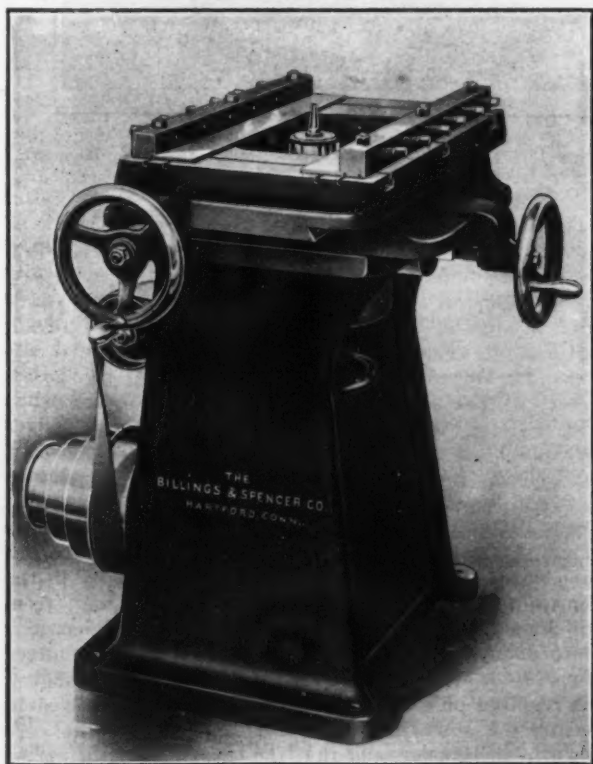


Fig. 1.—The New Billings & Spencer Miller for Trimming Dies.

A Novel Belt Conveyor System.

Its Use in Concrete Construction on the New York Barge Canal.

In connection with the construction of the Barge Canal by the State of New York a Bureau of Publication and Reports has been organized through which publicity is given to details of the various contracts and to articles descriptive of the progress of the work. A monthly publication of this bureau is the *Barge Canal Bulletin*, edited by Noble E. Whitford, resident engineer, Albany. In a recent issue the following interesting article appeared, describing the belt conveyor system now in use at Locks Nos. 4 and 5 on Contract No. 11:

The magnitude of the Barge Canal contracts which have so far been placed under construction has been productive of at least one good result. Confronted with the necessity of moving vast quantities of material ex-

cessment, sand and stone have been conveyed on belts before, the successful transfer of the aggregate, after its mixture, from the mixer to the form, without rehandling, is understood to be an entirely novel extension of their use. By an examination of the accompanying illustrations, Figs. 1 to 4, the course of the materials from the car to the mixer and of the aggregate thence to the locks may be readily traced.

Standard gauge tracks run to a point about midway between Locks Nos. 4 and 5, at which point a Hains concrete mixer is located. This point is about in the center of distribution of approximately 100,000 yards of concrete work. Four parallel side tracks afford sufficient room for the cars for supplying materials for 500 yards of concrete per day. One of these is for empty cars, another for stone and another for sand. In each of the two latter a hopper is constructed and the cars are dumped into these; thence the materials are taken by belt conveyors to the top of the mixer. When the bins on top of the mixer are filled, the stone and sand automatically over-

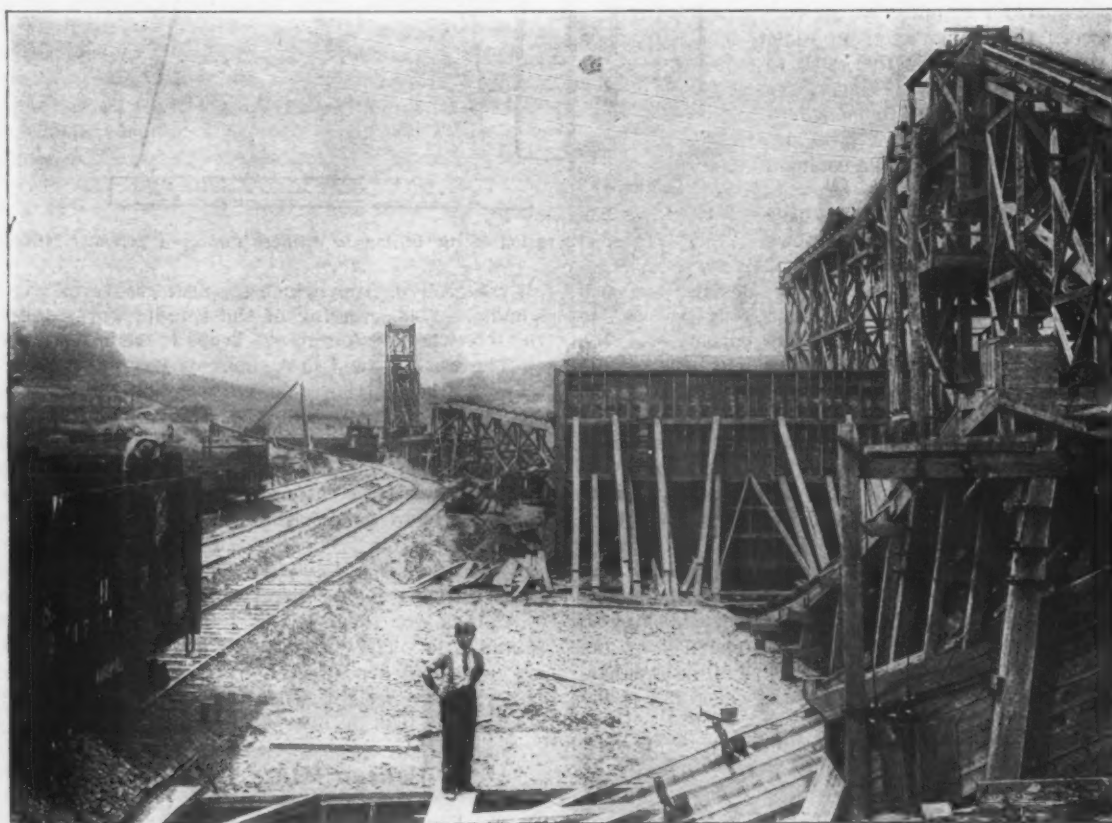


Fig. 1.—In this view are shown at the left three of the tracks, the fourth, not shown, passing through the cement house, in rear of the point of view. In the foreground, rising to the right, are the stone and sand belts from the hoppers beneath the tracks—on the first stage of their journey. In connection with the tall structure on the right, containing the mixer, are the bins for supplies of sand and stone, and over them the trestle and tripper car by which the stone is distributed.

peditionously and at the minimum of cost, the various contractors have introduced and are using numerous mechanical appliances in furtherance of this end, some of which are original, either in design or adaptation, and others which have been employed with success elsewhere in the broad field of engineering, but have hitherto been unknown along the line of the canals. Most of these appliances are so expensive to install that with smaller contracts their initial cost would have precluded their use.

Within the radius of perhaps a mile from Lock No. 4, in the vicinity of Waterford, the eastern terminus of the Barge Canal, is built, or planned, a group of massive concrete structures requiring, in the aggregate, more than a quarter of a million cubic yards of this material in their construction. Its handling, therefore, to advantage, becomes a matter of great interest. Most of the devices and equipment for this entire system were designed and supplied by the Robins Conveying Belt Company, New York, but the general scheme and many of the minor devices were designed by Herschel Roberts, president of the contracting firm, and himself an engineer of note. It should be borne in mind that while the dry materials,

flow and the sand passes by a direct chute into a sand storage bin. A similar excess of stone automatically overflows upon a belt equipped with a movable tripper car, so as to enable the stone to be distributed throughout the length of a storage bin adjoining the sand bin. Other belts pass underneath these storage bins and then rise on a slight curve, so as to feed the materials when wanted to the first mentioned belts, and these deliver them again to the top of the mixer. The fourth track is used chiefly for cement, and it passes along the side of a cement house, which is 50 x 150 ft., capable of housing about 10,000 barrels. Through the center of this house and just under the floor level runs a 20-in. belt, and after this leaves the cement house it curves gradually to the elevation of the mixer floor of the Hains mixer, from which point the bags are handled by one or two men, who place and untie them, ready for the men at the mixer hoppers. It will be seen, therefore, that the only shoveling required on any of the materials is that involved in getting the stone and sand from the ends of the cars down to the hopper, and that the carrying and lifting of cement is reduced to the minimum.

This plant can handle about a cubic yard per minute, but it has rarely been found possible to keep a sufficient number of places open and ready for concrete to main-

tain operations on this scale with the desired regularity. The maximum output thus far for an eight-hour day has been 450 yards. Handling the mixed material at that

rate involves the necessity for some method of transportation likely to be more steady and continuous than trains and buckets. For this reason, and because of the large

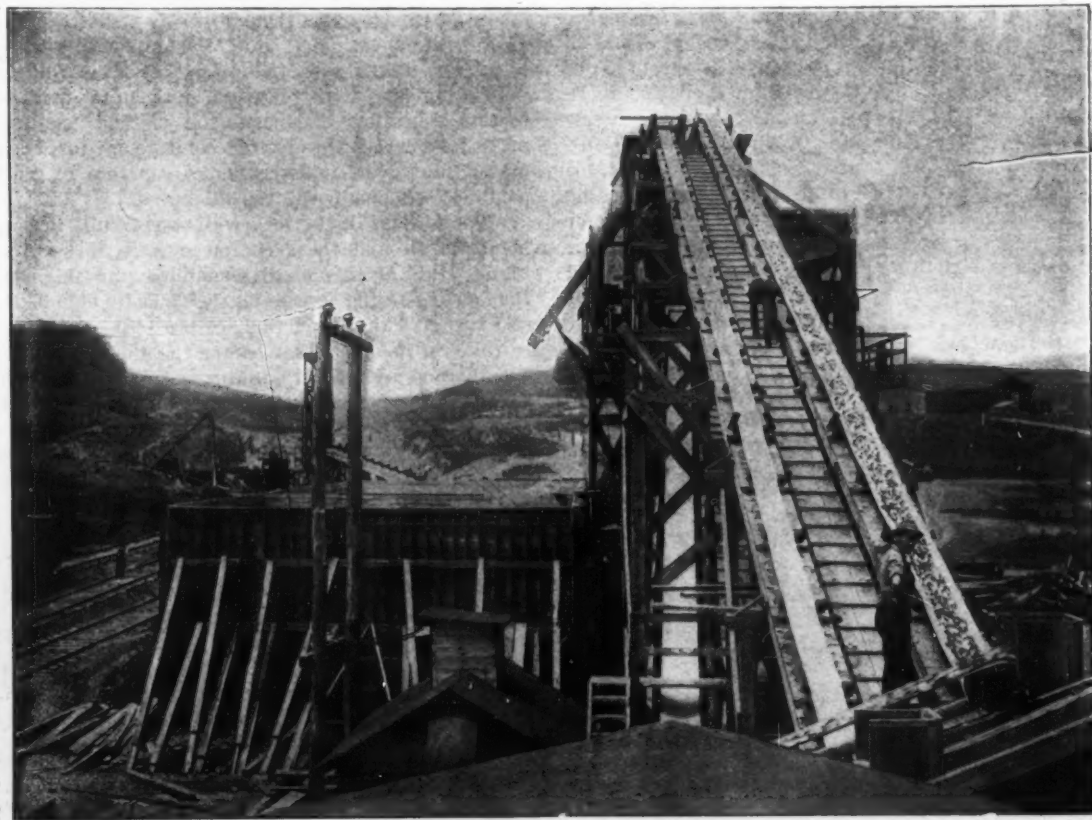


Fig. 2.—In the right foreground the sand and stone are transferred to a second pair of belts stretching away to the top of the mixer. Underneath is the cement belt, carrying up the sacks from the cement house, of which the end of the roof is shown. The chute for surplus sand from the mixer to the bin below is also shown.



Fig. 3.—From the upper end of Lock No. 5 and facing backward toward the mixer, shown in the distance. From the mixer the trestle leads to the middle foreground, bearing the track upon which is shown the huge tripper car. Between the rails is shown the belt, carrying concrete to the car. In the foreground is the boom, depressed, with its belt, delivering concrete into a short spout at the form.

tain operations on this scale with the desired regularity. The maximum output thus far for an eight-hour day has been 450 yards. Handling the mixed material at that

quantities involved in this work, the contractors decided to attempt the delivery and placing of the mixed concrete, at least to the locks, by means of belt conveyors.

The lower hopper of the main mixer is arranged with chutes and a short tilting spout, so that with the spout in one position the concrete can be fed into buckets, cars or wagons on one side of its center line, and when in the opposite position to the belt conveyors. Three such conveyors are required to reach the further end of either of the locks. The installation for Lock No. 5, the first one started and now completed, required one conveyor 80 ft. long, another 137 ft. long and then the conveyor running through the center of the lock, which is 600 ft. long. Each of the first two conveyors discharges into a Hains mixer hopper, so as to feed properly to the succeeding belt, and also so as to hold up the delivery of a whole or a part of a batch of concrete in case of any necessity for shutting down quickly. These three belts run at a speed of about 450 ft. per minute, but each succeeding one runs slightly faster than its predecessor, so as to correct, especially on the long belt, any excessive loading of the belt at the mixer.

The structure supporting the long belt through the

quantity of moisture in addition to that used at the mixer. From the end of the boom swinging spouts of various lengths, according to conditions, have been used, so as to collect all particles of the concrete to a narrow space when dropping them into the forms, and this device, with its swinging motion, has proved to be almost ideal, for, unlike any form of bucket discharging a large volume quickly, with the usual outrush of grout incident to that operation, it deposits the particles gradually and produces exactly the desired consistency throughout the mass. Moreover, it deposits the concrete in truly horizontal layers of any desired thickness.

The sections of the lock walls were built in lengths of about 40 ft. and the face forms were in sections 6 ft. high. Half of this height was filled and the boom was then swung to the section on the opposite side of the lock, so as to give the lower 3 ft. in the first section a chance to take on its initial set before the top 3 ft. was added. The method adopted in building one of these sections was to start in one corner and then by moving the car back-



Fig. 4.—A general view of the works at Lock No. 5, looking northwest; taken from the mixer and showing arrangement of plant.

locks also supports a huge tripper car, equipped with a boom 45 ft. long; this latter can be elevated or depressed to an angle of 20° and revolves through an arc of about 200° , so as to reach both sides of the lock. The main shaft passes up on this tripper car at an angle of 20° and trips its load upon the boom, which carries a conveyor operated by an independent motor. This car is propelled by five men, operating a capstan and winding the car along on a rope at the rate of about 6 ft. per minute. The boom is lifted and swung by hand winches, but all other work throughout the plant is done by electric motors. Current for these is taken from the lines of the Hudson River Water Power Company at about 13,000 volts and transformed to 550 volts at the works.

The structure supporting the conveyor and tripper car through the lock also carries electric wires with devices for connecting the wiring on the car at frequent intervals, so as to move back and forth. It also carries the main water pipe, as it passes from the Mohawk River to the lower end of the work. By connections placed at frequent intervals in this pipe, water is continually supplied to the car, and this is piped to the end of the boom where it can be instantly controlled, so as to supply to the concrete, just before it is deposited in the forms, any

ward or forward, swinging the boom in its arc and also swinging the spout across about 6 ft. of width to reach all parts of the section, readily forming any desired thickness. At first the grout required on top of an old section, prior to starting a new one, was sent out over the conveyors from the mixer, but later this was more readily accomplished by taking the dry cement to the section and adding water through the swinging spout from the end of the boom.

This plant has lately been used also in building the north and south core walls of Lock No. 5, containing about 800 yards and 1400 yards, respectively. These walls are over 30 ft. high, where they join the lock walls, and extend 200 ft. and 600 ft., respectively, from the lock walls. This work was done by means of "home made" bottom dumping cars of about 1 cubic yard capacity, run to the tops of the walls and supplied from the tripper car boom. In order to secure continuous operation of the belts for this work, on which only two cars could be used, the material delivered, when the cars were not in position, dropped into the section of the core wall nearest the lock, which was otherwise left for that purpose until final completion.

Mr. Roberts considers that this belt conveyor system

has decided advantages over the train and bucket method of conveyance, and he believes that better concrete is produced by it, saying that it seems perfectly clear that, instead of the particles becoming separated by dropping through the several hoppers and spouts from the mixer to the work, exactly the opposite result is obtained, and that the materials are better mixed at the end of their journey than when they leave the mixer itself; moreover, that so long as the concrete is fairly wet, it is evident that the last drop it takes from the boom, frequently as high as 15 ft, is a decided advantage rather than otherwise and that any uncoated stone that may have passed through the mixer receives a most effectual coating of the mortar as it finally drops into the mass.

The Krieger Lathe Boring Bar Holder.

A bracket holder for boring bars, drills, reamers and similar tools used in lathes, just brought out by the Krieger Tool & Mfg. Company, Grand Rapids, Wis., furnishes in a single attachment means of accommodating



Fig. 1.—Unassembled Parts of the Boring Bar Holder for Lathes, Made by the Krieger Tool & Mfg. Company, Grand Rapids, Wis.

tools of several different sizes. In addition to this advantage it is provided with a vertical adjustment, which facilitates centering.

This double adjustable bracket is composed of few and simple parts, as may be seen from Fig. 1, which shows it unassembled. It consists of a malleable cast bracket piece, A, having a slotted base which is clamped to the carriage without removing the tool post; a holder dog, B, which is clamped to the face of the bracket by draw bolts, E, and carries a bar supporting a hand screw for vertical adjustment; a clamp yoke, C, formed with grooved bearing arms that are clamped against the bar by the nut F on the threaded stem of the holder dog, and a reducing block, D, used in connection with tools from $\frac{1}{4}$ to $\frac{3}{4}$ in. in diameter, which fits in the saddle of the holder dog, where it is held in place by flat binding springs.

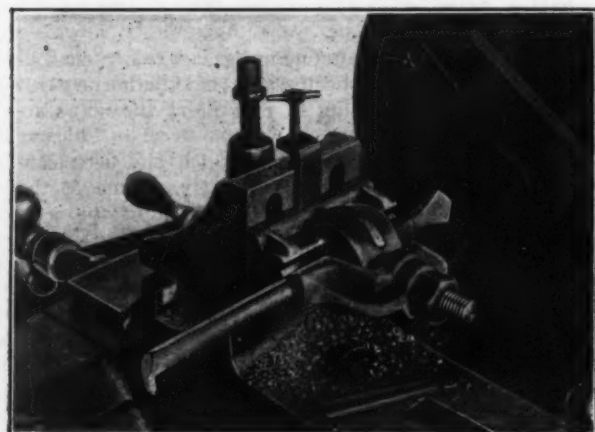


Fig. 2.—The Krieger Holder Supporting a Boring Bar.

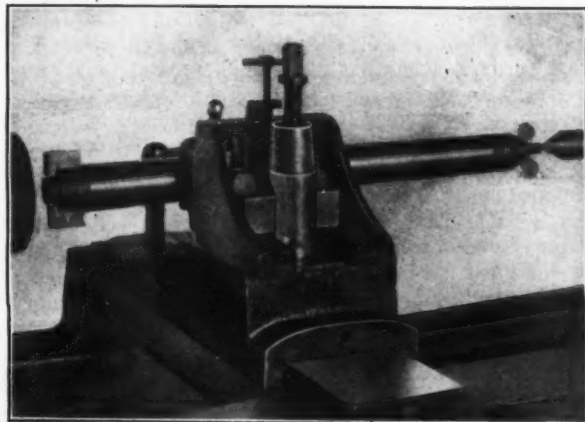


Fig. 3.—A Reaming Cutter Held in the Krieger Holder.

Front and rear views of the assembled tool set in position on a lathe carriage are shown in Figs. 2 and 3, which also illustrate its adaptability to different kinds of work. Boring bars, drills, &c., from $\frac{1}{4}$ to $2\frac{1}{2}$ in. in diameter comprise the range of capacity of the two sizes, No. 1 and No. 2, in which the bracket is made, No. 1 holding tools from $\frac{1}{4}$ to $1\frac{1}{4}$ in. and No. 2 from $\frac{1}{2}$ to $2\frac{1}{2}$ in. There is obvious economy in the flexibility thus afforded both in investment and time saved as compared with holders limited to single sizes, of which a greater number is required to cover the same scope of operations and which involve numerous changes and re-setting.

The height of vertical adjustment on size No. 1 is $1\frac{1}{4}$ in. and on No. 2 3 in., with bar bearings of widths respectively 4 and 6 in. These ample bearing surfaces insure a high degree of rigidity, which is enhanced by the firm manner of attaching to the lathe carriage. The No. 1 bracket fits lathes with 14 to 20 in. swing and the No. 2 is designed for swings of 20 to 30 in.

An Interesting Wire Rope Tramway.

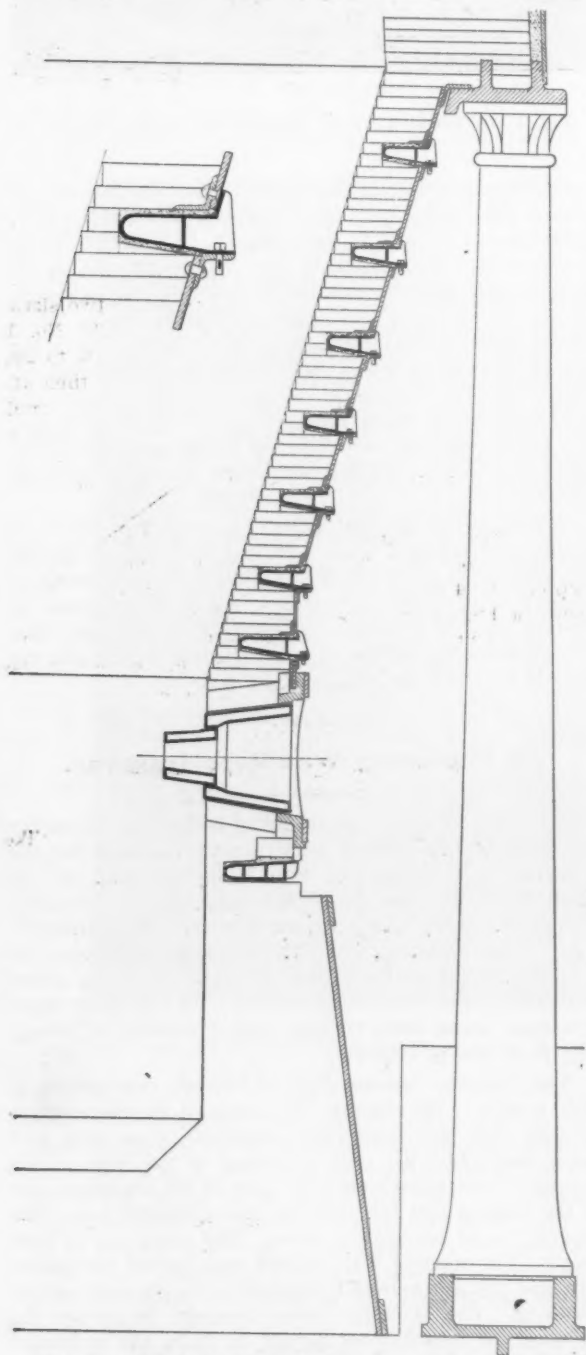
An overhead wire rope tramway believed to be unlike any other in this country was recently installed for the Monterey Lime Company, San Francisco, Cal., at its plant about 40 miles below Monterey, by the Hallidie-Painter Tramway Company, successor to the California Wire Works, Oakland, Cal. The tramway runs from the company's kilns to the ocean, approximately $2\frac{1}{2}$ miles, and passes over very rough country. In one place there is a span about 2600 ft. long and a number of others vary from 800 to 1600 ft.

The tramway handles lime in barrels, two barrels to each carrier. The barrels are enclosed in the carriers so that they are completely protected from rain and heavy fogs which are quite prevalent in that part of the country. Two attendants take care of the tramway, one at the loading and the other at the unloading end. The capacity is 50 barrels per hour. The operation is very simple; the carriers stop to load and unload automatically, and are automatically started when the next carrier comes in. The Monterey Lime Company has found the tramway of considerable benefit to it in the reduction of the cost of lime handling. Previously this was done by teams, and it is stated that the change in the mode of handling the lime has made such a difference to the company that where there was formerly a loss there is now a profit.

A sharp break in bar silver, October 3, both in London and New York brought the price down to the lowest figure reached in five years. At London silver declined 5-16d. to 23 1-16d. an ounce and New York quotations followed by declining $\frac{7}{8}$ of a cent to 50 cents an ounce. China sold silver freely in the London market, causing the break.

The Farrell-Roberts Bosh Construction.

Some of the experiences of the past few years with blast furnaces operating under high pressure and rapid driving have shown the need of great care in designing the furnace bosh when it is equipped with cooling plates. Accidents involving loss of life have resulted from failure of the bosh construction. And after a furnace equipped with bosh plates has been in blast for some time, trouble may arise from the brickwork between the plates becoming worn on the inside of the furnace, allowing the inner ends of the bosh plates to settle, displacing their water connections and rendering their removal difficult. Furnace managers, moreover, are not agreed



The Farrell-Roberts Blast Furnace Bosh Construction.

that the bosh plate forms the best bosh protection. Some prefer a bosh jacket with a thin lining of firebrick, the aim being to save expense, secure ample strength and maintain smooth and uniform bosh walls. The point is made, however, that unless the number of rows of bosh plates is excessive, less heat is extracted from the furnace by the circulating water in the bosh plates than is lost through the bosh jacket, and that for rapid driving and large products the former is preferable. This suggests, therefore, that the best bosh design would combine the merits of both types, providing a construction which would maintain the thickness of the brick walls,

securely hold the bosh plates in position and at the same time insure against serious accidents.

The design of bosh shown in the illustration is offered as fulfilling these requirements. It is covered by patents granted individually to Austin Farrell, Marquette, Mich., furnace manager of the Cleveland-Cliffs Iron Company, and Frank C. Roberts, Philadelphia. As indicated, it consists of a bosh jacket extending from the mantle to the top of the hearth. Openings are provided in the jacket for the bosh plates with an angle section band above the openings on the inside and a similar angle section band below the opening on the outside, the angles both above and below extending around the jacket. The openings are slightly larger than the bosh plates, and the latter are constructed with a lip on the upper side bearing against the jacket and a flange on the lower side which is bolted to the outer angle on the jacket. This construction permits the ready removal of the bosh plates and securely holds them in position when the brickwork is worn away. In the illustration the bosh brickwork is $13\frac{1}{2}$ in. thick and the bosh plates extend 9 in. within the jacket.

The cost of this construction, it is stated, is not more than that of an ordinary bosh equipped with bosh plates, while the strength and freedom from danger are much greater. The brickwork is less expensive by reason of the thin walls and absence of arches or other special supports for the brickwork over the bosh plates, and this saving, combined with the reduction in the cost of the bosh plates, amounts to approximately the cost of the bosh jacket. The durability of this form of bosh is indicated by the experience of the Cleveland-Cliffs Iron Company at its Gladstone and Marquette Furnaces in Michigan, both of which have a somewhat similar construction in use. In the former case the furnace has been in continuous operation for seven years and nine months and in the latter case for over five years. One of the large furnaces of the Wharton Steel Company at Wharton, N. J., is being equipped with a bosh of this design.

Western Electric Changes.

At a meeting of the Board of Directors of the Western Electric Company, held in Chicago, October 30, the following changes among the officers were made: E. M. Barton retired as president, becoming chairman of the Board of Directors. H. B. Thayer was elected president; H. A. Halligan and F. R. Welles, vice-presidents; William P. Sidley, vice-president and general counsel; George C. Pratt, secretary. Mr. Thayer had been vice-president for a number of years, and has been connected with the company for 28 years. He has had his residence in New York City and will continue to reside there. Mr. Halligan had for some time been secretary and in charge of a large part of the American business. Mr. Welles has been connected with the company for more than 30 years, and has charge of its foreign business, residing in Paris. Mr. Sidley has been acting as counsel for the company, and will continue so. His office of vice-president will not involve severing his connection with the firm of Holt, Wheeler & Sidley, of which he has been a member for some years.

The Western Electric Company is engaged in consolidating its manufacturing business at its Hawthorne plant in Chicago. It is removing to that plant the manufacturing heretofore carried on at Clinton street in Chicago, and the principal portion of that which has been conducted at its factory in New York City. Some of the engineering and other administrative work of the company will be conducted at New York. This is for the purpose of avoiding duplication between the Chicago and New York offices, and between the engineering department of the company and the telephone companies, its principal customers.

The Cuyuna Iron Range Railway Company, Duluth, Minn., has been incorporated, with a capital stock of \$100,000, for the purpose of building and operating an ore line from the Cuyuna range to the head of Lake Superior.

Coaling Barges at Havana, Cuba.

The type of coaling barge shown by the illustrations has been adopted by the Havana Coal Company in the work of outside coaling required for the large steamers making port at Havana, Cuba. E. H. Sanborn, the Philadelphia manager of the company, who evolved the plan of equipment, has changed the design in several particulars, notably in the shape of the conveyor tower, substituting a tapered steel structure for the rectangular wooden one provided on the early boats of which Fig. 1 is an example. The improved facility brought about by the introduction of these barges, which were built by Quigley, Davis & Dorp, Camden, N. J., is due to the elasticity of arrangement which permits coaling at the water level, or at deck height; and in the easy access to vessels surrounded by small lighters which may be receiving or delivering freight. The diagram, Fig. 2, gives a clear idea of this feature: the bow of the coaler can be run between or over the lighters, thus avoiding the delay of waiting for the clearance necessary to broadside loading.

The conveying apparatus, made by the Link-Belt Company, Philadelphia, consists of V-shaped buckets, 20

loaded. The conveyor travels at a speed of 120 ft. per minute, and can deliver 100 tons of coal per hour if run continuously, which, however, is rarely possible, as trimming in the bunkers necessitates intermittent operation. A 35-hp. engine, located at the base of the tower, is required because of the frequent starting of the conveyor under full load.

The efficiency of the barge has been demonstrated

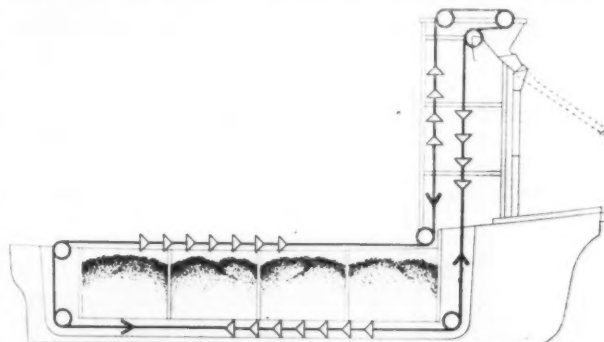


Fig. 3.—Sectional Diagram of a Barge, Showing the Course of the Link-Belt Conveyor.

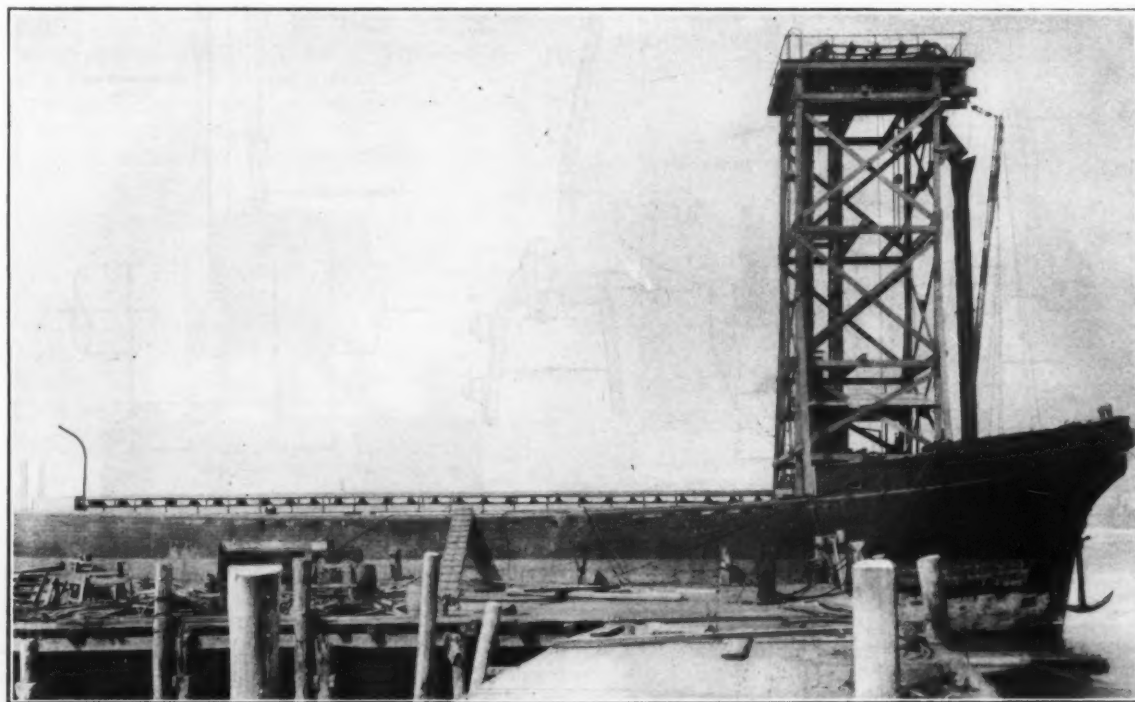


Fig. 1.—One of the Earlier Sanborn Coaling Barges Used by the Havana Coal Company.

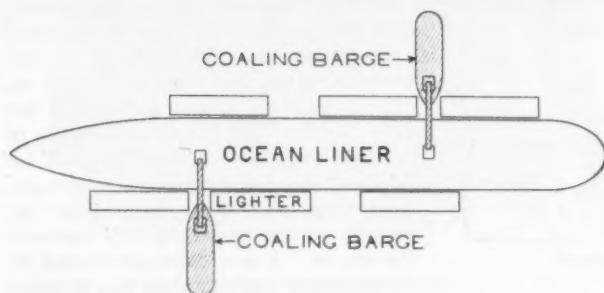


Fig. 2.—Diagram Showing Two Barges Coaling a Liner While Lighters Are Receiving or Delivering Freight.

x 20 in., attached at intervals of 36 in. to two strands of steel roller chain, running noiselessly in a trough 130 ft. long, built alongside the keelson of the barge and below the level of a false deck, as indicated in Fig. 3. The conveyor dumps at the top of the tower on the forward side into the hopper of a 60-ft. telescopic chute, 15 in. in diameter. With this chute the barge has a range of delivery from the water line to a bunker hatch 40 ft. above. The conveyor returns down the after side of the tower and along the deck where it is covered by a steel plate roof to deflect lumps of coal when the barge is being

under the varying conditions imposed by the time limits of the liners' anchorage, which often involves a stop for coal only, with its consequent demand for immediate attention; loading as high as 1200 tons in 8 hr. has been attained.* Many cases have occurred in which the coaling began at 4 p.m., continuing all night to be completed at 8 a.m. next day, when the vessel cleared. Ordinarily, the coaling is done from one barge on each side of a liner, though two on a side have been employed.

At a meeting of the newly elected directors of the Crucible Steel Company of America, held in Pittsburgh last week, the following officers were elected: William G. Park, chairman of the Executive Committee; Frank B. Smith, president; Reuben Miller, Herbert DuPuy, John A. Sutton and C. C. Ramsey, vice-presidents; Alexander Thomas, secretary; Charles W. Rowlands, assistant secretary; Julius Bieler, treasurer; A. A. H. Niebaum, assistant treasurer; George A. Turville, controller. Executive Committee: William G. Park, A. W. Mellon, Reuben Miller, Frank B. Smith, Herbert DuPuy, J. D. Lyon and James H. Park.

* In this connection an editorial concerning vessel loading and unloading economies in *The Iron Age*, February 13, 1908, may be interesting.

Nugent Engine Oiling Devices.

For effective lubrication of engine or other bearings the oil should be delivered where needed, with a positive and easily regulated feed. Two oiling devices for trunk or gas engines designed to fulfill these requirements are manufactured by Wm. W. Nugent & Co., Chicago. The sectional and side elevations, Fig. 1, illustrate the application of one of these devices to a vertical trunk engine

only the plan of piping and attaching, but also indicate the manner of operating.

In the device as adapted to a horizontal gas engine, Fig. 2, the oil is forced to the pins by the pumping action of the telescopic tubes *a* and *b*. The oilers are supplied with check valves, *c*, and stuffing boxes, *d*. The positions of these tubes when the engine is on forward center are indicated by the dotted lines *a'* and *b'*. Oil passing from the cup reservoir *e* is carried through the tube *b* to the crosshead pin through the tubes *b* and *f*, the latter

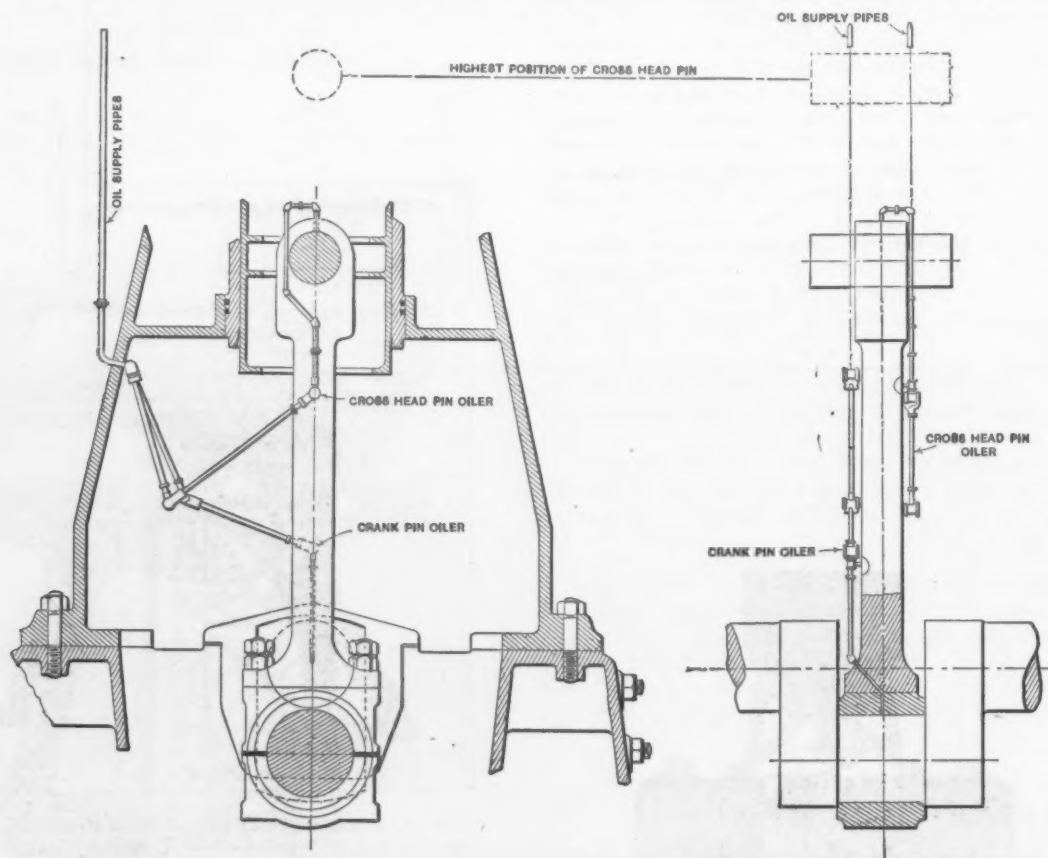


Fig. 1.—Oil Device for a Vertical Gas Engine Made by Wm. W. Nugent & Co., Chicago, Ill.

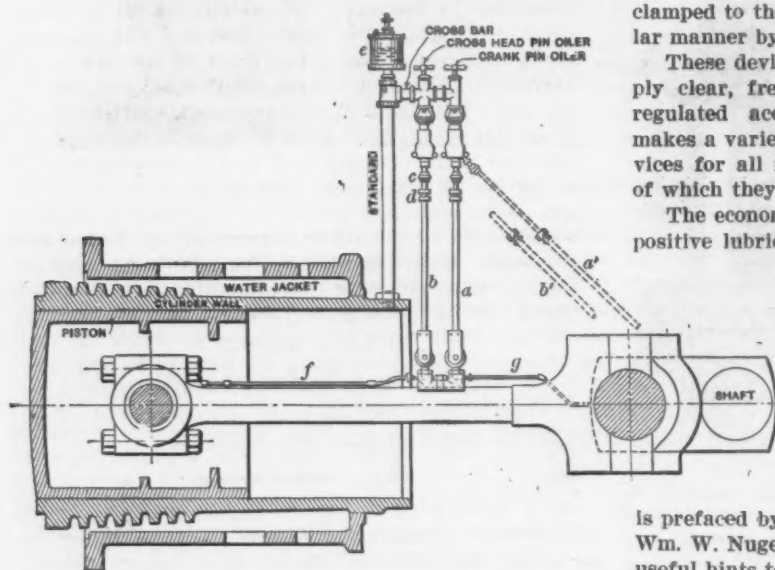


Fig. 2.—Nugent Oiling Device for a Horizontal Gas Engine.

for oiling the center crank and crosshead pin, and Fig. 2 the manner of attaching the other to a horizontal gas engine.

In both cases oil is forced under pressure through tubes provided with check valves, directly to the bearings. These tubes in Fig. 1 are connected with the oil supply pipe by oil tight steel knuckle joints and are similarly connected at the middle joints and discharge ends. The two views in this engraving show clearly not

clamped to the shaft. The crank pin is served in a similar manner by the tubes *b* and *g*.

These devices are built to stand high speeds and supply clear, fresh oil in quantities which can be closely regulated according to requirements. The company makes a variety of telescopic and knuckle joint oiling devices for all reciprocating parts of engines, to all types of which they can be readily attached.

The economy in wear and tear effected by regular and positive lubrication of fast running bearings is observed not only in the prolonged life of the wearing parts, but also in the saving of oil. The use of too much oil is not only wasteful, but frequently results in positive damage to bearings. The joints of these oilers are made of hardened steel, and it is claimed by the manufacturers that they will outwear the engine. A new catalogue issued by the company describing its line of oilers is prefaced by an article on "How to Oil an Engine," by Wm. W. Nugent, which contains valuable information and useful hints to engineers upon this subject.

An item printed on page 1088 in *The Iron Age* of October 15, mentioned contracts secured by the Meehan Boiler & Construction Company, Leetonia, Ohio. It should have read Lowellville, Ohio, the company having been located at the latter place for many years.

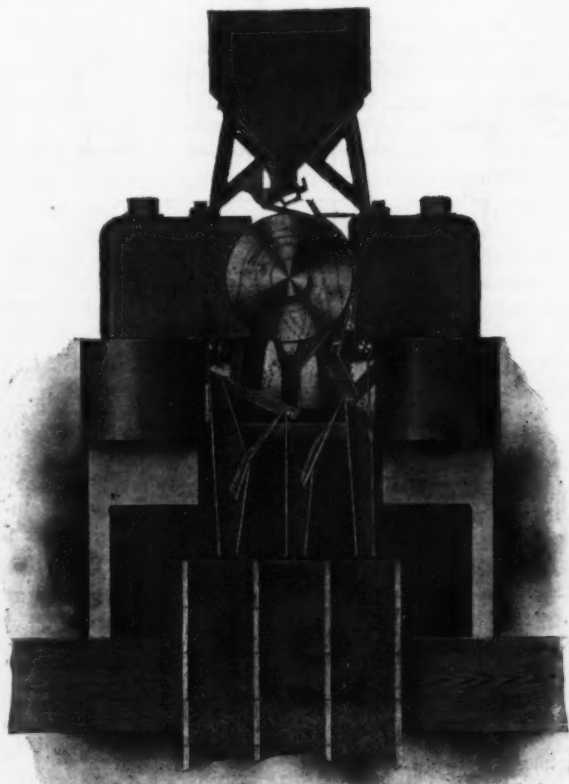
Corrigan, McKinney & Co., Cleveland, Ohio, are rebuilding their blast furnace at Scottdale, Pa. It is expected to be ready for operation early in December.

The International Magnetic Ore Separator.

The magnetic properties of certain ores early suggested the possibility of utilizing electro-magnets in the concentration of these ores. This idea was first conceived at a time when electric current was not very generally available commercially; a fact which prevented the development of such apparatus at that time. However, with the present day facilities for obtaining electric current in any locality this system has been made commercially practicable, and the Western Electric Company, New York, in its new International Type E separator, claims to have an efficient and economical machine for concentrating magnetic ores.

This separator is of the bipolar revolving drum type, the field magnets being energized by two form wound field coils of large capacity, which are mounted on the two legs of the field magnets. The field frame is cast from dynamo steel and the revolving drum or armature is built up of steel laminations, which are carefully annealed, thus reducing the core loss to a minimum. There is no winding or electrical connection of any sort on the armature, a construction that insures reliability under the most severe conditions. The only moving part in the separator is the armature, which is rotated by a pulley belted to a shaft or an electric motor. The motor drive is preferable because it permits of adjusting the speed to suit the conditions of operation.

The operation of this machine is very simple. The ore is fed from a hopper at the top of the machine through an adjustable gate, the function of which is to



Sectioned View of the International Type E Magnetic Ore Separator Made by the Western Electric Company, New York.

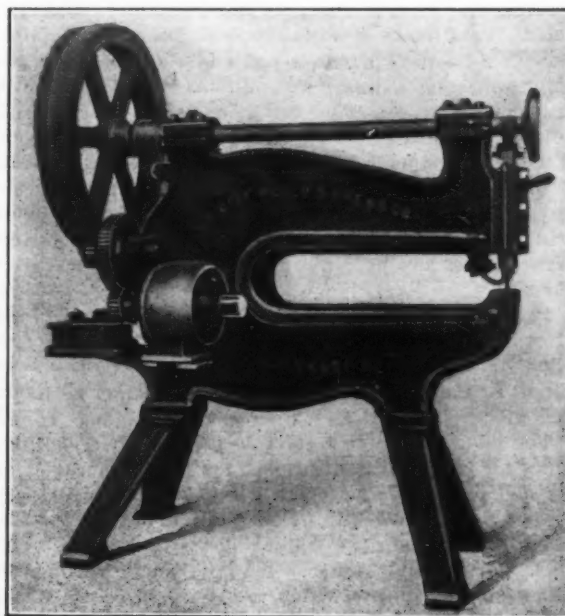
regulate and distribute the flow upon the armature. As this armature revolves the material is carried under the pole face at one side. The magnetic material adheres to the armature while the nonmagnetic material drops off. There is a field pole on each side of the armature for directing and concentrating the magnetic field of force. There is, therefore, at or near the bottom of the armature a neutral point where a reversal of magnetism takes place. When the material reaches this point even the most highly magnetic substances will be thrown off. By means of adjustable deflector plates arranged beneath the armature, the different products may be collected as

desired from under the surface of the rotor as they are successively thrown off under the gradually weakening attraction. The adjustment is so fine that materials differing but slightly in magnetic susceptibility may be separated with the greatest facility.

These machines have a capacity of from 60 to 100 tons a day, and many of them are now being used in mines in this country and Mexico. They are also especially well adapted for the separation of flue dust from blast furnaces, cleaning up of bone ashes, glass sand, &c., as iron in any form is readily removed.

A Queen City Sheet Metal Punch.

A recent product of the Queen City Punch & Shear Company, Cincinnati, Ohio, is a new quick acting porta-



A New Quick Acting Motor Driven Sheet Metal Punch, Built by the Queen City Punch & Shear Company, Cincinnati, Ohio.

ble motor driven sheet metal punch. It is designed to economize in time and be specially useful in different parts of the shop. The head is operated with cam motion giving a direct stroke. The front of the jaw is made narrow to accommodate very small work, and the throat gap has a height of 2 in. to accommodate offsets or angles in special work. The die is set solid in the housing, not attached in the ordinary way, and is therefore not likely to get out of alignment. The depth of throat is 24 in. and the capacity 3-16 x 3-16 in. The punch is designed to be driven by a 1/2-hp. direct current motor. Swivel wheels or casters can be attached to the legs of the machine so that it may readily be moved to any part of the shop. The weight is approximately 780 lb.

A. S. M. E. Monthly Meeting.—"The High Powered Rifle and Its Ammunition" will be the subject of a lecture by Franklin Phillips, president of the Hewes & Phillips Iron Works, Newark, N. J., and inspector of small arms practice in the New Jersey National Guard, given at the monthly meeting of the American Society of Mechanical Engineers Tuesday evening, November 10. It will cover something of the great advance which has been made in the last few years in accurate rifle shooting and the development of the rifle as an instrument of precision. Lantern slides will be used to illustrate details of rifle construction and the actual use of the arm in the field and target practice.

Hubbard & Co., Pittsburgh, Pa., manufacturer of shovels, spades and scoops, have recently increased their capital from \$99,000 to \$500,000. The increase was not made for any specific purpose, but was done so that the capital would more nearly represent the actual investment of the firm in its plants.

Electrically Driven Rolling Mills.*

Results With Siemens Companies' Installations.

BY C. KOETITGEN AND C. A. ABLETT.

The employment of electric power for rolling mill driving offers great facilities for the exact measurement of the power required for different classes of work, and enables the knowledge as to how the power varies for different sections, and how it is affected by variations in temperature and quality of the metal, to be widely extended. The power which a mill is taking can be seen at a glance from the ammeter, which may be fitted with a scale to read horsepower instead of amperes. The total horsepower hours or kilowatt hours required per day or per shift can be read directly from a suitable integrating meter. Continuous records can also be easily obtained showing how the current, speed and voltage of the mill motor vary under different conditions by using three instruments—i. e., recording volt-meter, ammeter and speed indicator, each of which automatically trace their records on a strip of paper. These records show the exact value of the power required during each pass. Such results are almost impossible to obtain from a steam engine, owing to the labor involved in working out the very large number of indicator diagrams which have to be taken.

In many Continental mills advantage is taken of the integrating meters to keep daily records of the tons rolled of various sections and the kilowatt hours required, so that the cost of rolling each section is known exactly.

The figures in table I refer to three mills. The high values for the kilowatt hours per ton rolled for the channels and tees under reference Nos. 11-14 may be chiefly attributed to the cooling of the section toward the last passes, the temperature coming down to about 850 degrees. This cooling is due to the large surface which the section presents in proportion to its weight. In addition these sections require more passes than the simpler square or round bars; the channels, for instance, are given 13 passes, as compared with six for the round bars.

The 1.7-in. diameter round bars require a greater power than the 1.2-in. round bars, but the output of the larger round bars was comparatively small as compared with that of the smaller ones, and the power recorded includes that when running the mill round light.

The results for the sheets show large values for the kilowatt hours per ton, owing to the large number of passes required, and to rapid cooling of the sheets. The temperature of the metal before the first pass ranged from 1183 to 1250 degrees, while at the last pass it had come down to 800 degrees.

mill for a certain required output of similar sections. Taking as an example the result for the 24-lb. flanged mine rails given in the table under reference No. 2, it will be seen that 41.8 kw. hours per ton are required with an output of 135 tons per day. The total energy required per day of 10 working hours is therefore 5640 kw. hours, and the mean output of the motor is 564 kw. Making due allowance for the efficiency of the motor, the average horsepower of the motor given during the day will be 700. It would, however, be necessary to increase the average power of the motor considerably, and the amount of the increase necessary can only be found by careful consideration of the arrangement of the mill, of local conditions, and by previous experience. The mill from which the results referred to above were obtained was driven by a motor capable of giving 1200 h.p. continuously.

It is not merely sufficient to dimension the motor so as to deal with the average power required, making due allowance for interruptions in working and so forth, but it must also be capable of giving as an overload the maximum power required. A case was cited in which the maximum power taken by the motor was 650 kw., while the average power was 368 kw. This corresponds to a maximum output of 810 hp., and an average output of 460 hp.

A considerable margin should be allowed between the maximum power which is probably required and that which the motor can give, as the maximum power required frequently occurs toward the last passes when the material is becoming cold, and a comparatively small variation in the temperature of the material is found to have a very considerable effect on the power required for rolling. This, of course, assumes that the number of passes in the case of the new mill is about the same as that for the old mill, and that the drafts are very similar. Should heavier drafts, however, be taken in one or two passes of the new mill, the power must be correspondingly increased. In any case, experience shows it to be desirable that the motor should be able to give as a maximum overload a torque corresponding to twice its normal full load rating.

Flywheels.

If no flywheel were used, a motor of larger size than that which corresponds to the average power would have to be installed in order to deal with the maximum power, but the flywheel will so reduce the maximum power which the motor has to give, that the size corresponding to the average power can be installed. The size of the motor cannot, of course, be reduced below this limit, although in some cases it is of advantage to provide a still heavier flywheel in order to equalize the power taken from the supply mains. With a direct current motor the necessary fall in speed can be obtained by using a compound winding, but with a three-phase motor a resistance must be inserted in the rotor circuit, which increases the slip of

TABLE I.						
No.	Type of section.	Energy required, kilowatt hours per ton.	Final length, Feet.	Weight of billets, Pounds.	Dimensions of billet, Inches.	Output per day, Tons.
1.	Flanged mine rails, 28 lb. per yard.	37.5	92-97	860-910	5.1 by 5.7	143.0
2.	Flanged mine rails, 24 lb. per yard.	41.8	68-94	550-760	5.1 by 5.7	135.0
3.	Flanged mine rails, 20 lb. per yard.	44.5	130	660-875	5.1 by 5.7	115.5
4.	Flanged mine rails, 18 lb. per yard.	47.5	90-135	550-815	5.1 by 5.7	114.0
5.	Flanged mine rails, 12 lb. per yard.	48.6	87-135	353-547	4.3 by 4.7	117.0
6.	Flanged mine rails, 8 lb. per yard.	54.0	113-139	330-375	4.3 by 4.7	88.0
7.	Round bars, 1.2 in. in diameter.	38.3	89	327	5.1 by 5.1	...
8.	Round bars, 1.7 in. in diameter.	40.3	43.5	287	5.1 by 5.1	...
9.	Square bars, 0.8 in. square.	42.0	82	165	5.1 by 5.1	...
10.	Square bars, 1.4 in. square.	28.8	51	335	5.1 by 5.1	...
11.	Channels, 1.57 x 0.79 x 0.2 in.	63.50	98	187	5.1 by 5.1	...
12.	Channels, 1.18 x 0.59 x 0.16 in.	111	105	154	5.1 by 5.1	...
13.	Tees, 1.2 x 0.16 in.	136	82	110	5.1 by 5.1	...
14.	Tees, 1.38 x 1.8 in.	68.2	88.5-92	155	5.1 by 5.1	...
15.	Flats, 2.35 x 0.4 in.	33.3	98	330	5.1 by 5.1	...
16.	Flats, 1.95 x 0.4 in.	41.5	106	294	5.1 by 5.1	...
17.	Flats, 1.5 x 0.32 in.	52.0	105	176	5.1 by 5.1	...
18.*	Sheets, 42 x 95 x 0.09 in.	84.0	..	388	7.9 square.	...
19.†	Sheets, 51 x 147 x 0.22 in.	95.0	..	450	33.5 by 15 by 4.7	...
20.‡	Sheets, 48 x 88 x 0.1 in.	80.0	..	415	6.7 square.	...

* Three sheets were rolled from each billet. † One sheet was rolled from each billet. ‡ Three sheets were rolled from each billet.

Determination of Motor Power.

Such results as the above are of considerable assistance in settling the correct size of the motor for a new

the motor. Records taken on a 1200-hp. three-phase motor show that the flywheel has reduced the maximum power which the motors is required to give from 1980 hp. to 1200 hp., while the maximum variation in speed was from 163 rev. per min. to 152 rev. per min., about 7 per cent. variation. A flywheel is most suitable for equaliz-

* From a paper read at the Middlesbrough, Eng., meeting of the Iron and Steel Institute, September 30, 1908. Mr. Koettgen is managing director of the Siemens Brothers' Dynamo Works, Ltd., London, Eng., with which Mr. Ablett is also connected.

ing fluctuations in power where the maxima only last a very short time, and where there is time between successive maxima for the flywheel to regain its speed. Should the maxima last a long time a much heavier flywheel is required, because a much larger amount of energy has to be given up. In the case of a looping mill where the metal may be in the rolls for several minutes, it is practically impossible to obtain any equalization with the aid of a flywheel and the motor must be large enough to give the maximum power required.

The flywheel must not only be capable of dealing with the fluctuations of energy required for each pass, but also the total energy which it had to give up as it drifted down in speed in order to make up the balance of the energy which it was not able to regain in the interval between the passes. Such a drifting down in speed is very clearly shown in passes 1 to 5 of a roughing mill of which a record was taken, and the amount of energy which was given up and regained at each pass is shown in table II:

TABLE II.

No. of Pass.	Speed at commencement of pass. Revolutions per minute.	Speed at End of pass. Revolutions per minute.	Energy given up by fly-wheel during pass. Horsepower seconds.	Energy regained by fly-wheel between passes. Horsepower seconds.	Difference.
<i>Roughing Rolls.</i>					
1	163	159	1700	300	.... -1400
2	159.8	157	1150	200	.... - 950
3	157.5	154	1450	650	.... - 800
4	155.5	153	1100	200	.... - 900
5	153.6	152	600	2950	+ 2350
6	159	156.5	1050	1450	+ 400
<i>Finishing Rolls</i>					
1	160	157	1300	750	.... - 550
2	158.8	158.3	200	750	+ 550
3	160.3	159.1	300	650	+ 350
4	160.5	159.5	450	950	+ 500
5	161.8	....	....	....	....

The table shows that while in the heaviest single pass the flywheel had only to give up 1700 hp. seconds, yet owing to the drifting down in speed which occurred during the first five passes in the roughing rolls the flywheel had to give up a total of 4050 hp. seconds to make up the balance of the energy which it could not regain between the passes. In proportioning a flywheel, therefore, for a definite case, such a possible drifting down in the speed should not be overlooked.

Where a three-phase motor is used, and the fall in speed is obtained by placing a slip resistance in the rotor circuit, a loss of power takes place in the slip resistance which is proportional to the slip required and to the power which the motor is giving. No such loss of power takes place in the case of a direct current motor where the fall in speed is obtained by using a compound winding. In consequence of this, with a three-phase motor, a less fall in speed is usually allowable than is the case with a direct current motor, and consequently a heavier flywheel has to be used to give out the same amount of energy.

It is sometimes stated that the loss of power which occurs in providing a slip resistance for a three-phase motor in order to enable the flywheel to reduce the peaks which the motor has to carry, can be avoided by providing an automatic arrangement by which the slip resistance is only connected in the rotor circuit when the load is such that the current taken by the motor exceeds a predetermined limit, and is switched out again when the maximum load is passed.

There is not, however, the saving in efficiency which would appear at first sight, as the slip resistance remains connected in circuit during the periods of maximum load (when the power lost is also maximum) whether it is provided with an automatic arrangement or not, and it is only switched out of circuit during the periods of minimum load when the loss of power is comparatively small. It cannot be said generally whether the employment of an automatic slip resistance is an advancing or not; each particular case must be judged on its merits.

Output of an Electrically Driven Mill.

It is almost invariably found that when a steam engine driving a rolling mill is replaced by an electric

motor a greater output is obtained from the mill. The rail mill from which results Nos. 1 to 6 in table I were taken was installed for an output of 100 tons per day, but the results show that this figure has been considerably exceeded, and 150 tons per day have been obtained a good many times. The reason a greater output can be obtained from an electrically driven mill than from a steam driven mill is that the speed of the electrically driven mill remains very nearly constant, whatever work it is doing, and in this case the speed of the electrically driven mill was much increased when the electric drive was installed. The rails were handled by a lever man and a catcher with tongs, and it was found that when the mill was driven by steam at 100 rev. per min., the speed at which the rails left the mill continually varied, so that they were not easy to catch, as the catcher never knew at quite what speed they were coming. When the mill was driven electrically the speed was increased to about 140 rev. per min., and the men found it was comparatively easy to catch the rails, because, although they were leaving the rolls at a higher speed, they always came at the same speed. The men who were working on piece work approached the management to have the speed of the mill still further increased, and it was then increased up to a maximum of 163 rev. per min., it being necessary to speed up the gas engine driven alternators in the power house.

The fact that the speed did not fall as much as 10 per cent. even at the heaviest pass was also found an advantage in enabling a large output to be obtained, as there were no delays, such as took place when the steam engine was almost stalled by a heavy pass. The steady speed obtained with electrical driving is partly due to the fact that the overload capacity of an electric motor is much greater than that of a steam engine, and partly to the fact that an electric motor responds instantaneously to any increased demands for power. An electric motor which is capable of giving, say, 1000 hp. continuously can work very economically when only giving 700 hp. or so, and is quite capable of giving a torque corresponding to 2000 hp. instantaneously. It thus may be said to have an overload capacity of over 180 per cent. An economical steam engine, on the other hand, only has an overload capacity of about 25 per cent. more than its normal rated horsepower. A steam engine can, of course, be made to give a much greater overload than this, but it would not work economically when giving the average power required.

Drafts Taken with a Reversing Rolling Mill.

Recently several tests have been made on reversing blooming mills to ascertain the work required to roll out ingots to different elongations. The electrical equipment for a reversing mill may be briefly described as consisting of an Ilgner flywheel converter set and a reversible mill motor. The Ilgner flywheel converter set, which runs continuously in one direction and requires practically constant power, is driven from the source of supply, and consists of one or more variable voltage dynamos which supply current at varying voltage to the reversing mill motors, and a flywheel which equalizes the variations in the power required by the reversing mill motors. This electrical equipment is working economically in the sense that the greatest output is obtained for a given capital outlay, if the drafts are taken so that the motor is giving constant torque at each pass, this torque being the maximum working torque of the motor.

The curve in Fig. 1 is drawn to show a comparison of two methods of rolling a 3-ton ingot measuring $19\frac{1}{2} \times 19\frac{1}{2}$ to $17\frac{1}{2} \times 17\frac{1}{2}$ down to 6×4 rail billets in 11 passes. This curve is taken from the results given by Dr. Karl Wendt of Georgsmarienhütte in a recent paper. The curve given by Dr. Wendt related to ingots weighing 4850 lb., but as the ingot in the present case would weigh about 6700 lb., the ordinates of the curve, which represent the work required for elongation, are all increased in the proportion of 6700 to 4850. The full lines which are drawn horizontally show the elongations and work done, corresponding to drafts, which are so arranged that the motor gives equal torque at each pass, this torque being

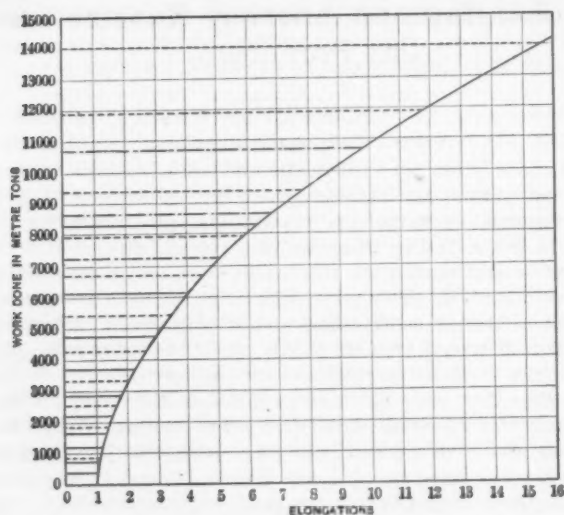


Fig. 1.—Curves for Blooming 3-Ton Ingot.

Full lines show the elongation and work done where the torque in each pass is constant and equal to 90 ton-meters. Chain-dotted lines show the elongation and work done where the torque in the last passes is reduced from 90 ton-meters to 55 ton-meters. Dotted lines show the elongation and work done where the drafts in each pass are selected arbitrarily.

90-ton meters. Table III. shows the drafts taken to obtain this result:

	Dimensions in inches.	Torque. Ton-meters.
	19½ by 19½ to 17½ by 17½	—
1st pass.....	18 by 19½ to 17½ by 17½	90
2d pass.....	16.8 by 19½ to 16.8 by 17½	90
3d pass.....	16.8 by 18.2 to 16.8 by 17½	90
4th pass.....	16.8 by 16.4	90
5th pass.....	14.6 by 16.4	90
6th pass.....	12.6 by 16.4	90
7th pass.....	12.6 by 13.2	90
8th pass.....	12.6 by 10	90
9th pass.....	9.4 by 10	90
10th pass.....	6 by 10	90
11th pass.....	6 by 4	90

The last two passes are shown as above merely for the purposes of comparison. In an electrically driven mill it would be found better to arrange them somewhat differently, in order to reduce the size of the flywheel converter set.

The dotted lines in Fig. 1 show the elongations corresponding to drafts in the case of a mill for which electric driving came under consideration, and where in working out the power required the torque was found to vary between very wide limits, as shown in Table IV:

	Dimensions in inches.	Torque. Ton meters.
	19½ by 19½ to 17½ by 17½	—
1st pass.....	19½ by 16½ to 17½ by 16½	186
2d pass.....	19½ by 13½ to 17½ by 13½	164
3d pass.....	16½ by 13½	110
4th pass.....	13½ by 13½	102
5th pass.....	13½ by 10½	82
6th pass.....	13½ by 8	82
7th pass.....	10½ by 8	73
8th pass.....	8 by 8	53.5
9th pass.....	8 by 6	46.5
10th pass.....	8 by 4	53.5
11th pass.....	6 by 4	33

It will be seen by comparing Tables III and IV, that while in the first case the ingot is rolled out in 11 passes by a motor capable of giving 90-ton meters torque, in this latter case the motor was required to give 186 ton-meters torque in the first pass, and this gradually fell to 33 ton-meters torque in the last pass.

The curves on Fig. 2 show a comparison between the torques and elongations in the two cases, the full lines representing the rolling out of the ingot when the motor is giving constant torque, and the dotted lines the second case.

The driver of an electrically driven mill has the ammeter in the mill motor circuit always in front of him, and as the reading of the ammeter is exactly proportional to the torque which the motor is giving so long as the field of the motor remains constant, he is able to see when the drafts are being so taken that the motor is giving its

maximum torque—that is to say, the greatest possible output is obtained from the equipment. In order to facilitate this the position of the ammeter needle corresponding to the maximum working torque of the motor can be suitably marked. While the drafts with an electrically driven reversing mill can be so taken as to get the maximum output of the mill without much difficulty, it is impossible to attempt such a thing with a steam driven reversing mill, as there is no ready means of showing the torque which the steam engine is giving, and the question of attempting to take the drafts, so as to obtain the maximum output, becomes a matter of long experience—that is to say, trial and error—for if too heavy drafts are taken the engine is stalled, and if the drafts

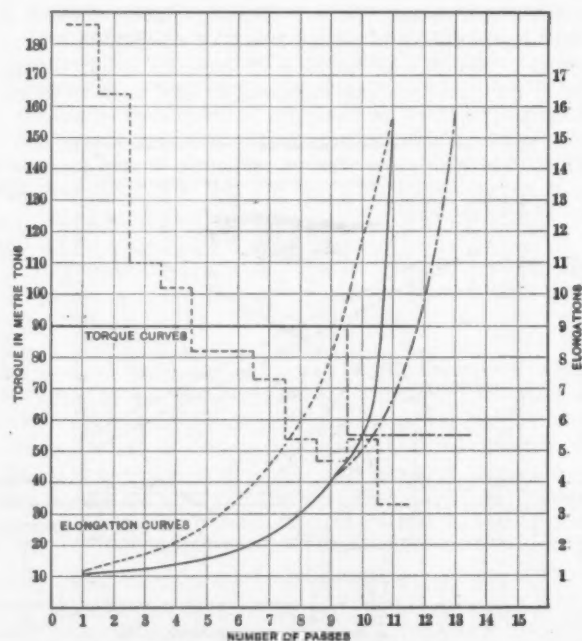


Fig. 2.—Curves for Blooming 3-Ton Ingot.

Full lines show the elongation and torque where the torque in each pass is constant and equal to 90 ton-meters. Chain-dotted lines show the elongation and torque where the torque in the last passes is reduced from 90 ton-meters to 55 ton-meters. Dotted lines show the elongation and torque where the drafts in each pass are selected arbitrarily.

are too light the proper output is not obtained from the mill.

Discussion.

A. Lamberton remarked in discussing the paper that there is no question of the propriety and utility of driving rolling mills by electricity. Where the motor runs constantly in one direction this would undoubtedly be an ideal method of driving, but some question arises as to the complicated installations required for working reversing mills. He indicated a method of driving a reversing mill by steam, which he believed could compete with an electrical drive. The common way of driving a reversing mill is by clutches, but the shock is tremendous. He would still use the clutch arrangement but with some modifications. He would put in two friction clutches simply to start the masses from rest slowly. As soon as the reversing mill came within 5 per cent. of the normal speed a positive clutch went in automatically. Since the two were running at almost the same speed the latter went in almost without any shock. He believed there were important possibilities in this construction, of which more would be heard.

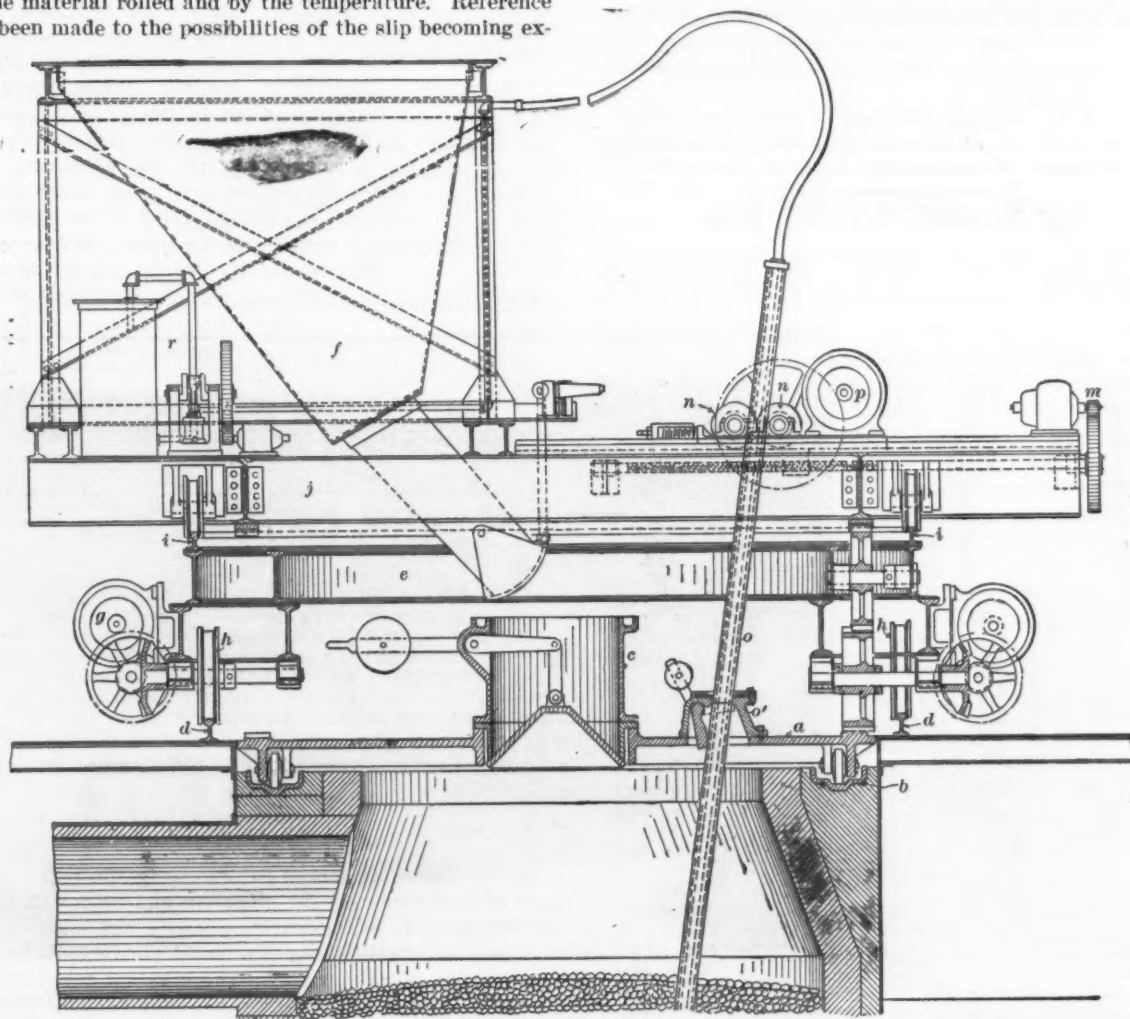
A. Greiner of the Cockerill Works, Seraing, Belgium, said that the coupling of electric motors to rolling mills is absolutely indispensable. In Germany a dozen plants are being built of from 8000 to 13,000 hp. after a thorough study of the question of electric drive. In some cases the current is produced by steam turbines, and in other cases by gas engines. Reckoning coal at its present price and allowing 15 per cent. for depreciation of machinery the conclusion was reached that electricity is nearly as economical as steam, in spite of much higher

cost of installation, when the electricity is produced from the waste gases of blast furnaces. This cost goes up appreciably when coal has to be burned to supply current. The rolling of a ton of ingots cost 12 cents in the first instance and about 18 cents where coal is used. In a three-high mill driven by a motor of 1000 hp. the change of velocity went up to 20 per cent. on finishing passes. The speed variation of 7 per cent. referred to in the paper he considered too small. A continuous current motor is to be preferred for rolling mill driving, as it is better able to stand high overloads.

C. A. Ablett, one of the writers of the paper, replying to an inquiry for the actual cost of electric drive, said that the paper gave kilowatt figures from which costs could be figured out according to varying conditions. Comparisons of the cost of rolling electrically and by steam are not easy as between different companies, since the power required is affected greatly by the composition of the material rolled and by the temperature. Reference had been made to the possibilities of the slip becoming ex-

A Charging and Stirring Machine for Gas Producers.

The S. R. Smythe Company, Pittsburgh, Pa., has devised a machine for charging gas producers and for stirring the coal during the gasifying operation, patents having been granted to Horace E. Smythe and Edmund W. Shinn. The apparatus is equipped for traveling along a line of gas producers and consists in the main of a car which is motor driven and carries a revolving platform and other mechanism. It is provided with an operator's cage in which are controllers connected to the various motors, and it is calculated that one man operating the machine, with the addition of one gas maker, can feed the coal, poke the charge and operate a battery of 10 to 12 producers. In the illustration a gas producer is shown with a revolving top plate *a*. A circular channel *b* on the



A Charging and Stirring Machine for Gas Producers.

cessive, reducing the output. If there is a considerable interval between the passes there is no necessity for an automatic slip regulator.

Cut Gears of Large Size.—The Fawcus Machine Company, Pittsburgh, has recently furnished eight cut gears of unusual size, two of the largest being nearly 14 ft. in diameter, with 88 teeth, 5½-in. pitch and 18-in. face, the heaviest weighing about 25,000 lb. They are to be used in heavy sugar cane crushing machinery, especially designed for a plantation near Havana, Cuba. The great size of the gears is required by the heavy load which they will be obliged to carry, as they will transmit 400 hp. When the order was received by the Fawcus Company a special machine of 20 ft. diameter and 42-in. face, capable of cutting practically any pitch, was designed and built in its own shops. Subsequently, it was found that the work could be handled with the old equipment, and the contract was completed in about two months' time. The gears were made in four cast steel segments which were bolted and keyed to an iron spider. The pinions are of solid steel.

top of the producer body constitutes a track for the wheels of the top plate and a water pan for a gas seal. The car *e* travels over the producers on the rails *d*. It carries the hopper *f* having an inclined bottom and a spout through which fuel is delivered into the hopper *c*. The motor *g* drives the car through spur gears, a shaft and bevel gears, the latter being connected with the wheels *h*.

The car *e* supports a circular track *i* on which travel the wheels of the revolving carriage *j*. The trolley supports a radially movable bed plate provided with the lug *k*, in which the radially arranged screw *l* works. The screw is rotated by the motor *m* and intermediate gearing. The bed plate carries the rollers *n*, one of which is fixed and the other movable. The carriage of the latter gives the rotary motion of the poker *o* while in the fire, and the rolls, which are held in tension by spiral springs, secure the poker and give it the vertical motion for poking the fire to any depth that may be required. The rollers are grooved so as to form a circular pass between them for the reception of the poker, which is actuated

vertically by the motor *p* and intermediate gearing. The poker is hollow, and two flexible tubes, leading to its upper end, one of them being connected with a tube which extends to the lower end of the hollow in the poker, convey cooling water, supplied from the pump and tank at *r*.

In order to poke a charge in the gas producer the car, with the poker elevated above the top plates of the producers, is moved along the rail until the axes of rotation of the top plate and the trolley *j* are in alignment. Mechanism is provided for adjusting the poker to the required position above any poke hole. In the operation of poking, the top plate and the trolley *j* are given a rotary movement. When the charge has been sufficiently poked the motors involved in the operation are stopped and the poker is lifted from the poke hole; the car is moved so as to bring the trolley over the top plate of another producer and the operation is repeated. The machine accomplishes the poking of the entire charge from center to circumference to any desired depth. The poker has a zigzag movement in the charge as it travels in a circle with the poke hole, the latter serving as a fulcrum for the poker.

The S. R. Smythe Company is about to construct a machine after the design above detailed, and will install it in connection with an existing gas producer plant.

The Columbia Hydraulic Ram.

One of the features of the hydraulic ram made by the Columbia Steel Company, Portland, Ore., is the construc-

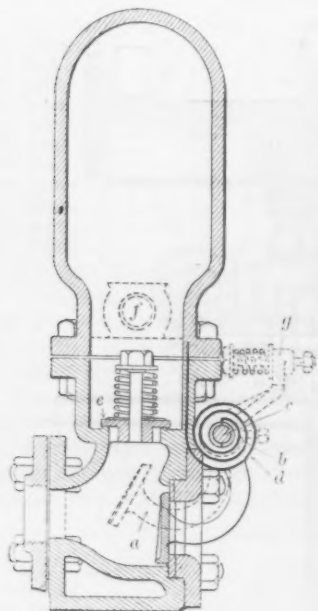


Fig. 1.—Vertical Section of the Columbia Hydraulic Ram.

tion of the ram body with relation to the waste valve, which gives a direct passage, insuring a smooth, continuous movement of the water until it has left the waste valve. By referring to Fig. 1, a cross section of the ram, it will be seen that the ram body is so designed that when the waste valve is open the drive water has a straight shoot through the ram, which means the elimination to the greatest possible extent of the loss by friction so excessive in rams having circuitous passages through their waste valves. This absence of friction allows the drive water to attain a high velocity, causing a quick, sharp closing of the waste valve, which results in the utilization of the maximum amount of power in the water with the minimum amount of waste. Another feature of the construction is the placing of the delivery valve immediately above the waste valve, so that the course of the water through the delivery valve to the air chamber is direct and automatically deflected by the shape and position of the waste valve. Still another feature is the motion of the waste valve, whereby a supply of air is taken into the upper portion of the ram body with every stroke. This furnishes a positive air supply and eliminates the

troubles of water logging so prevalent in rams where the old style snifter valve is used.

The drive pipe, which is of varying length, is attached to the ram body by a flanged joint. The waste valve *a* is suspended by its curved arm from a bearing *b*. The spindle *c* carrying the valve *a* also has attached to it by means of an adjustable collar a flat coil spring *d*, which engages on a log or ear on the flange of the frame body. By moving this set collar the spring may be set to any desired tension to meet varying conditions of head and speed. The discharge valve *e* allows the water to enter the air chamber whence it is carried to its destination by a pipe connected to the opening *f*.

The operation is as follows: The drive water flows through the open waste valve *a* until the required velocity is attained, when it has sufficient force to close the valve. During its flow the water has gathered a certain amount of energy. This energy (momentum) is liberated when the flow is suddenly arrested, and will then exert a force sufficient to overcome the discharge pressure on top of the valve *f* which now opens and allows a portion of the water to enter the air chamber. While the valve *a* is closing, it rotates the collar on the spindle *c*, placing the spring *d* in tension, until the flow through the discharge opening is completed and the discharge valve closes, when the water in the drive pipe comes to rest and the direction of the moving column is reversed, causing a tendency to a vacuum in the upper portions of the ram body. At this instant the tension of the spring *d* assists the partial vacuum in opening the waste valve *a*



Fig. 2.—An Installation of the Columbia Rams for Irrigating in the Yakima Valley, Washington.

and admits a supply of air immediately under the discharge valve *c* ready to be discharged into the air chamber on the next stroke.

Where the ratio of fall to lift is small and the rebound in the water is consequently slight, the auxiliary spring is attached to an upper arm *g* projecting from the hub of the waste valve on the spindle *c*; this is called the rebound or low ratio attachment.

A recent installation of Columbia rams at Sunnyside, in the Yakima Valley, Washington, is shown in Fig. 2. It consists of 11 6-in. rams, operating under a fall of 37.6 ft. and a lift of 143.11 ft. from the rams. Under these conditions, with a consumption of 5.11 cu. ft. per second of drive water, 1.15 cu. ft. of water per second is lifted to the point of delivery. This is stated to be a higher efficiency than has been attained by a water wheel directly connected to a centrifugal pump, hence the claim that this is the most economical and efficient machine for irrigating purposes where a moderate fall can be obtained.

The Columbia ram is made in sizes having drive pipes of from 1 to 6 in., and can be operated under heads of from 2 to 40 ft., and will elevate 40 ft. for every foot of fall.

Customs Decisions.

Steel Forgings.

After a delay of two years the Board of United States General Appraisers October 31 handed down a decision sustaining a protest filed by Thomas Prosser & Son, New York, regarding the rate of duty to accrue on importations of merchandise alleged by the Government to be dutiable as "manufactures of metal" at 45 per cent.

It was shown from the testimony that the articles in dispute consist of crank axles, piston rods, cross heads, crank pins, crank shafts and connecting rods. The articles are entirely of steel and are formed or produced by hammering or pressing. The importers set up the contention that the merchandise should be allowed to enter at the rate of 35 per cent. under the provision in the tariff act for "forgings." General Appraiser Fischer, who writes the decision for sub-board No. 2, finds that the weight of evidence is in favor of the importers and their contention is accordingly sustained.

Two years ago when the same sub-board had reached a decision favorable to the importers, the full board of general appraisers took the determination of the question out of the jurisdiction of the sub-board and thereupon proceeded to make a decision against the Prosser firm. The importers then appealed to the United States courts, alleging that the action of the full board in interfering with the decision of the sub-board was illegal. This contention the courts upheld and the determination of the issue was remanded for decision to the sub-board originally having jurisdiction.

Steel Bowls for Separators.

The Board of General Appraisers has disposed of a customs controversy concerning rate of duty to accrue on importations of steel hoods or bowls for cream separator machinery by holding that the merchandise is dutiable at 4 7-10 cents per pound as "pressed, sheared or stamped steel shapes," or as "steel in all forms or shapes not specially provided for, valued above 16 cents per pound." F. J. Arend, New York, the importer, was able to show by uncontradicted testimony that the bowls or hoods are made by pressing from a sheet or plate of steel, and that no other labor is expended upon them after leaving the press than to coat them with tin. The testimony further shows that this tinning was done solely for the purpose of protecting the bowls from atmospheric influences and that it is removed in the process of the further manufacture necessary to prepare the articles for their ultimate use as parts of cream separators. The inability of the Government to controvert successfully the evidence submitted by the importers leads the board to sustain the protestant's contention for the lower duty. The classification imposed by the Government is reversed.

Welding Material.

Metal and borax welding material has been decided by the Board of Appraisers to be dutiable at the rate of 45 per cent. under the provision in the tariff for manufactures of metal, or of which metal is the component material of chief value. The Chicago Metal Reduction Company set up the claim that the article is dutiable either as a mineral substance or else as an enumerated or unenumerated article under section 6. The board finds that the classification complained of is correct and that the return made by the collector of customs must stand.

Several routine decisions were handed down during the past week by the board affecting the classification of metal importations. The board sustained protests as follows: The Pickering Governor Company, Hartford, Conn., steel strips; J. W. Hampton, Jr., & Co., Philadelphia, steel strips; J. C. Metzger & Co., New York, steel strips; Hermann Boker & Co. and George Nash & Co., New York, cold rolled smoothed only steel strips. Claims overruled included Joseph F. McCoy & Co. and others, New York, steel in strips; United Metal Box Corner Company, strip steel coated with tin; Borgfeldt & Co., Baltimore and Newport News, dog collars of metal and leather.

Copper Cash Swords.

A controversy regarding the classification to be awarded so-called "copper cash swords" was settled by the Board of United States General Appraisers when it was decided that articles of this description imported by Soy Kee & Co., New York, are dutiable properly at the rate of 45 per cent. under the provision in the tariff act for "articles of metal not specially provided for." The importers contended that the classification of the articles was erroneous and that the swords should be admitted to free entry as "coins," or, if dutiable, they should be assessed at 35 per cent. as "swords," or at 10 or 20 per cent. under section 6, which provides for unmanufactured or manufactured articles. In denying the contentions of the importers, General Appraiser Fischer, who writes the decision for the board, says that swords in question are made up of a number of copper coins corded together and securely fastened around an iron rod or bar covered with metal foil. The general appraiser acknowledges that the articles are in the form of swords. At the same time the chief contention of the importers is for duty as "coins," which claim the board holds to be without merit. The classification returned by the collector is therefore upheld and the protests overruled.

Advance in Freight Rates.

Effective early in November the railroads operating west of Chicago have made an advance of 60 per cent. in rates on iron and steel in carloads, moving from Chicago to the industries of northern Illinois, as far as the Mississippi. The rate in this territory was formerly 5 cents per 100 lb., but has been advanced to 8 cents. There has also been an advance of 1 cent per 100 lb. in the rate on iron and steel from Chicago to East St. Louis, making the rate 9 cents instead of 8.

The railroads east of the Mississippi have "checked in" general advances in both class and commodity rates, the latter covering nearly all of the important commodities carried. The lines west of the Mississippi have checked in a general advance in commodity rates.

The new tariffs are ready to be printed and filed with the Interstate Commerce Commission.

The Grand Trunk Railway Company of Canada will formally take over the electrified International Tunnel between Sarnia, Ont., and Port Huron, Mich., November 12. The work was completed some months ago by the Westinghouse Electric & Mfg. Company, which has since been carrying on the operation of trains through the tunnel by electricity. The electrification of the St. Clair tunnel has attracted the attention of engineers in all parts of the world. The installation of the electric plant cost \$500,000, including the power plant, wiring, locomotives and other equipment for an overhead wire power supply system. Four heavy electric locomotives have been built for the work. They are among the largest of their kind in the world, have a tractive power 30 per cent. greater than the steam locomotives and can haul trains at an average speed of 10 miles an hour over the heavy tunnel grades. The new system also insures safety from noxious gases, which is more important than efficiency or speed, as the St. Clair tunnel, since its completion in 1891, has gained an unenviable notoriety by the number of fatal accidents which have occurred in it.

The E. Keeler Company, Williamsport, Pa., has been awarded contract for 12 410-hp. water tube boilers for the Isthmian Canal Commission. These boilers, which will be installed in two plants, one to be located at Gatun and the other at Miraflores, will be used to operate the cable ways and other machinery for building the locks and dams at those points. This is said to be the largest order for boilers placed by the Isthmian Canal Commission, and is the first prominent plant to be installed on the Isthmus. The boilers will be used in operating the canal after construction work is finished. The general contract for the work was taken by the D'Olier Engineering Company, Philadelphia, Pa., and includes Foster superheaters and Ajax shaking grates.

THE IRON AGE

Established in 1855.

New York, Thursday, November 5, 1908.

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						HARDWARE EDITOR.

The Iron Market 12 Years Ago.

On November 4, 1896, the business interests of the United States celebrated tumultuously the victory for sound money, won at the polls on the day preceding. In *The Iron Age* of November 5, just 12 years in advance of the present issue, were the first of the well remembered chronicles of that time—announcements of orders for iron and steel that had been made absolute because the election result had removed the condition originally attached to them. The memory of the average producer or dealer still retains so perfect an impression of the tenor of the industrial news that filled the newspapers 12 years ago that no citations from the record are necessary. Plants were reported as starting up in every quarter; working forces were increased; projects whose carrying forward was contingent on the defeat of free silver began to show life. In the iron trade, working forces were increased and orders flowed in from a variety of sources immediately following the election. There was, in fact, so hilarious a campaign of prosperity on paper that the necessity of an appeal for moderation soon became apparent. In *The Iron Age* of November 19, just two weeks after the first effects of the election upon the iron trade had been bulletined, this note of warning was sounded:

There is a widely prevalent feeling in the iron trade that the hysterical "booming" to which many have lent themselves lately is doing vastly more harm than good. It is raising expectations which are doomed to meet with disappointment. In fact, there is an undertone of that kind even now. There is being urged in favor of an early and substantial rise in prices that the whole country is bare of stocks and that the requirements for replenishing are alone sufficient to make a rushing demand. It is urged, too, that the country is generally down at the heels and ragged, so far as repairs and renewals of equipment and plant are concerned. People point to the rise in cereals and discourse about the effect which that must have upon buying on the part of farmers.

All this is conceded and is the foundation upon which the expectation of a strong revival in business rests. The only questions are, how soon the improvement will come, how much headway it will secure, and how long it will last. The sanguine insist that it is coming now and is going to be tremendous. The conservatives expect a gradual and moderate improvement. They say that it takes time to finance new undertakings, and that, above all, this is not the season in which the iron trade can expect much. . . . If matters shape themselves favorably it is the second half of January, February and March which brings out the spring and early summer requirements and starts the mills running double turn.

The report of the American Iron and Steel Association, covering 1896 and the early months of 1897, commenting on what actually did happen after the spurt which followed even so momentous an election, says that the year closed with business in all lines no better than it had been at its beginning; that after November and December had seen the release of the pent up orders of the preceding months of uncertainty and anxiety, no fresh tide of activity and prosperity came to take their place.

Prices fell steadily, and in the spring months of 1897 were lower than they had ever been, while wages were very generally reduced. In December, 1896, occurred the dissolution of the wire nail pool, and in the same month the billet pool came to an end. In February, 1897, came the sensational collapse of the steel rail pool, and in May the beam pool went to pieces. Bessemer pig iron sold in May at \$9.25 a ton, and steel billets touched \$13.85. The whole year 1897 was marked by the painful effort of the iron and steel trades to establish themselves on a sound basis after so remarkable a succession of disturbing events. Measured by pig iron production the year showed an increase of about 12 per cent. over the starveling rate of 1896. How gradual was the widening of consumption appears from a pig iron production of 8,623,127 gross tons in 1896, 9,652,680 tons in 1897, 11,773,934 tons in 1898 and 13,620,703 tons in the boom year 1899. As against a 12 per cent. increase in one year following 1896, and 58 per cent. in three years, there was in a single year following the reaction of 1904 an increase of 40 per cent. in pig iron production, or to 22,992,380 tons in 1905.

This leaf from the iron trade history of later 1896 and earlier 1897 is reproduced chiefly to emphasize the contrasts between the conditions and the possibilities then and the conditions and possibilities now. Anything more revolutionary than the changes that have come over the American iron trade in the 12 years beginning with the November election of 1896 could scarcely be imagined. If there is one conclusion of general application to which the record points it is that while panics break in suddenly upon prosperity, there is no quick reverse sequence of panic and prosperity. A return to prosperity is more than a mere matter of declaration, and it may be slow-paced even when a measure of confidence has been restored and the fear of hurtful legislation removed.

The Producer Gas Marine Engine.

Much optimistic discussion has appeared of late concerning the use of producer gas engines in large units for marine propulsion, based to an important extent upon the recent successful performance of the old British gunboat *Rattler*, which was equipped with this motive power for experimental purposes. The opinion has grown that the time is not far distant when the largest types of vessels will be using gas engines in place of steam, effecting great economy in fuel consumption, and, in the case of warships, giving largely increased radius of action and the important advantage of practically smokeless funnels. The *London Engineer* devotes the leading editorial of a recent issue to this subject, the writer taking so conservative a view of the problems facing engineers in the development of this type of marine engine as to seem extremely skeptical of early results in installations of large size. The logic of his argument appears to be well sustained by the facts he cites. While admitting that gas power will eventually become a definite integral part of marine engineering, he points out that the enthusiast is apt to lose sight of, or, at least, slur over the limitations of the gas engine and producer as at present constructed and by so doing renders a disservice to the cause of progress. While we may be quite certain that gas power will play an important part in marine engine development, we may be equally certain that the process will be slow and tedious. Evolution and not revolution is the keynote of this as of most other engineering problems, and the idea of very large war or merchant ships propelled by internal combustion engines of many thousand horsepower as an immediate possibility is a dream and nothing more.

The difficulties which must be overcome, according to this analysis of the status of the producer gas engine, are enumerated. In brief, the engine must be reversible, which is easily accomplished in small units through a reversing propeller or clutch and gearing, but up to the present time the largest size which has satisfactorily been made reversible is 80 b.h.p. As to type of engine, the horizontal presents serious objections for marine purposes, because of the inaccessibility of the exhaust valve which present practice places at the bottom of the cylinder end, with the valve spindle pointing downward and requiring considerable vertical space, which would bring an important mechanism in the bilge of the ship even if the center line of the shaft could be raised sufficiently, which is very improbable. As was the case with the horizontal marine steam engine, radiating surfaces would be below the working platforms, making ventilation by the introduction of cool air a serious problem. From these difficulties the deduction is made that the vertical gas engine will have to be adopted, and the statement is made that much more experience is necessary with this type ashore before it can be adapted for marine propulsion. Then comes the problem of the size of cylinder, of which the writer says:

Many of the difficulties connected with gas engines are known to be a function of the size of the cylinder; below a certain diameter they do not exist, but they increase in magnitude and importance as this diameter is exceeded, and this feature, which is now universally recognized, has led many competent engineers to the view that it is better to accept an increase in the number of cylinders and limit their diameter rather than to court the troubles which lurk hidden in the larger sizes. How far this view will influence the development of the marine engine remains to be seen, and though the mind turns rather naturally against the idea of multiplicity of parts, we may in time get used to it, and contemplate quite calmly an arrangement with 20 or more cylinders on one shaft. Mr. Yarrow has shown that with petrol engines a boat can be successfully run with 20 cylinders, though not all on one shaft, and our submarine boats from the A to C classes, inclusive, have 16 cylinders capable of developing an aggregate of about 800 b.h.p.

Apart from the objection of multiplicity of parts, an increase of the number of cylinders has many advantages. The variation of turning moment is considerable in an engine having, say, four cylinders, and a flywheel is necessary to insure steady running. Further, with a gas engine the mean pressure cannot be reduced to any great extent without danger of misfire, owing to the mixture being too weak; hence large variation in speed is out of the question with few cylinders.

To meet the requirements of a marine gas engine which shall compare favorably in control with our present steam engines, it would appear to be necessary to have a sufficient number of cylinders, so that reduction in speed may be first obtained to a certain extent by reducing the strength of the mixture, and afterward by cutting out one or more cylinders; but the number of cylinders left in action at the slowest speed which may be required must be sufficient to give a reasonably uniform turning moment. Weight will also be saved by an increase in the number of cylinders. This may appear paradoxical, but the reason is that the smaller the diameter of the cylinder the higher the speed of revolution at which the engine can be run. It is not always remembered, when reference is made to the extreme lightness which is obtained per horsepower in petrol engines that this is not because they are internal combustion engines, but on account of their extremely high speed of revolution.

At the other end of the scale the large slow running gas engine, using blast furnace or producer gas, where the mean pressure per square inch in the cylinders is not sensibly different from that obtained in petrol engines, the weight per horsepower is enormous. For the purpose of warships, where weight and space occupied are primary considerations, a large number of cylinders appears inevitable.

So much for the mechanical difficulties. In addition there are the thermal problems under which head come the design and operation of the gas producer. Of this the article states:

Any marine engineer who has inspected a shore installation of a gas plant designed for bituminous coal will at once realize that the very large space occupied by the apparatus for purifying the gas makes the adoption of such a plant impossible on board ship. With anthracite or coke the gas plant does not occupy excessive space, but probably no ship

owner or naval authority would consent to be tied down to these fuels, especially in view of their limited supply as compared with steam coal. What is required is a gas producer which, without bulky or elaborate cleaning apparatus, can produce a gas satisfactory for the purpose from ordinary steam coal.

The position taken by the *Engineer* agrees with the opinions of numerous engineering experts on this side of the Atlantic. Dr. Charles E. Lucke, professor of mechanical engineering in Columbia University, recently said: "You cannot go in the market to-day and buy a gas engine that will drive a large ship. There are plenty of designers that will promise to build one, but engineering experience has proved that it is a long trip from designer to successful installation."

The Unions' Right to Fine Their Members.

Much has been accomplished by the courts of the several States in the past year or two in establishing the limits within which difficulties between employers and their employees may be legally carried on in the attempt to secure settlement under the duress of strikes. The Massachusetts Supreme Court has just made another contribution to this class of legal precedent in a decision which determines the principles underlying the rights of the several parties where a labor union seeks to use the punishment of the fine in compelling its members to join in a strike, the court holding that the union may be enjoined from imposing a fine under these conditions on the ground that a third party, the employer, would be a sufferer by the action. The decision in a previous Massachusetts case is affirmed, in which it was held that "the imposition of such a fine by which members of an organization were coerced into refusing to trade with the plaintiff (the employer), not a member, to his great damage," was inconsistent with the ground upon which the right to competition in trade is based, and against him was not justifiable.

The case just decided was that of the Willcutt & Sons Company vs. Driscoll and others, members of the Bricklayers' Benevolent and Protective Association, in which the plaintiff prayed for an injunction restraining the union from imposing fines on members where the sole purpose was to compel workmen to go out on strike. A strike was in progress, and the defendants found two men at work for the plaintiff, one a journeyman who had been a member of the union, the other a foreman who was then a member. These men were threatened by the defendants with fines of \$100, but refused to leave their work. The defendants reported the fact to the union, and it was voted to prefer charges against the two for working contrary to the union rules. A temporary injunction was issued, restraining further action. In deciding the case for the plaintiff the majority of the court holds:

If it were only between the person fined and the party imposing the fine, then with some degree of plausibility it might be said that the former had no right to complain or at least had waived the right; but it is manifest that neither of the immediate parties to the fine can, either by agreement among themselves or waiver, justify the invasion of the right of a third party, if any he has, to object to it. It cannot be successfully contended that as against the right of some party other than the association and its members an act, otherwise a violation of the third party's rights, is any less a violation because done by some member in obedience to a by-law. An interference with the right of a third party cannot be justified upon the ground that the intruder is acting in accordance with an agreement between him and some other person. In a word, so long as a fine is imposed for the guidance of members in matters in which outside parties have no interest, or in which there is no violation of a right of an outside party, then no such party can complain. But when the right of such party is invaded it is no defense, either to the person fined or to those who have imposed the

fine, that the invasive act was done in accordance with the by-laws of an association.

If it be said that the member fined may take his choice either to leave the organization or abide by its rules to which he has before assented, and that where there is a choice there can be no coercion, the answer is that in almost every conceivable case of coercion, short of an actual overpowering of the physical forces of the victim, there is a choice. The highwayman who presents his cocked pistol to the traveler and demands his purse under pain of instant death in case of refusal offers his victim a choice. He may either give up his purse and live or refuse and die. And so the member of a labor union has the choice either to pay the fine or leave the union. Is it difficult to realize what that choice is in these days of organized labor? Is it too much to say that many times it is very difficult, indeed practically impossible, for a workman to get bread for himself and his family by working at his trade unless he is a member of a union?

The court goes on to state that labor unions are entitled to protection to the extreme limit of the law, but holds that to allow such fines threatens a free labor market. A minority opinion of the court, signed by two justices, states:

The law does not do so vain a thing as to allow the formation of labor unions and to declare their right to initiate and by lawful means to carry on a justifiable strike, and then refuse them the use of the only practical means by which their acknowledged rights may be secured. What seems to us the fallacy of the majority opinion is its failure to act upon the fact that the strike in this case was upon justifiable grounds, and, of course, was lawful. The right of an employer to conduct his business without interference in the labor market is subordinate to the right of his employees to strike and to maintain the strike in a lawful manner. As against this right of the employees the employer has no right to have their labor flow to him uninfluenced or undiverted.

The opinion of the minority of the court in this case appears to be more reasonable. Unions are formed for the purpose of securing advantages for their members, either by making demands for better terms from employers or by resisting reductions in wages. This being recognized, how are they to enforce discipline among their members except by fines? They must not resort to violent methods, and when they simply use the peaceful means of a fine it would seem wise not to interfere with such a regulation.

Congressional Tariff Committee Hearings.

WASHINGTON, D. C., November 3, 1908.—Many inquiries are being received here by Senators, Representatives and Treasury officials from parties desiring to be informed as to the steps that should be taken to secure an opportunity to be heard by the tariff committees of Congress before the prospective new tariff bill is formulated. These inquiries come from Importers as well as domestic manufacturers and reflect the very lively interest in the tariff question that has been aroused by the preliminary movements of the Senate Finance and the House Ways and Means committees.

The Preparation of Data.

Experience in connection with the framing of the last three tariff laws has demonstrated the necessity for systematic work in the preparation and presentation of representations intended to influence the Congressional committees. As the first step letters, which may be identical, or practically so, should be addressed to Representative Sereno E. Payne, chairman of the Ways and Means Committee, and to Senator Nelson W. Aldrich, chairman of the Senate Finance Committee, describing briefly the industry in which the writer is interested and asking to be advised when the committee will give hearings on the particular schedule covering such industry; also as to whether the committee desires to receive written statements with regard to rates, classification or administrative features of the proposed new tariff law before hearings on the several schedules are begun. With a view to receiving the greatest possible consideration at the hands of the tariff committees, it has sometimes been found desirable in connection with the framing of tariff bills in the past to solicit the co-operation of the

Senators representing the State and the Congressman representing the district in which the writer's business is located. In such cases it may be well to supply Senators and Congressmen with copies of all communications forwarded to the tariff committees. No disappointment should be felt should replies be received to the effect that no hearings are immediately in contemplation; hearings will ultimately be held and all requests for notice thereof will receive attention in due time.

In preparing for hearings it is well to bear in mind the conditions under which they will be held. Written statements should be prepared at least in duplicate, and, while as comprehensive as possible, should be no longer than is absolutely necessary to properly present the subject. Fifteen or 20 min. is about the usual time granted to a single representative of an important industry at the formal hearings, although frequently a much longer period is occupied in cross examination by members of the committee. Experience has demonstrated that it is unwise to print statements prepared for the Congressional committees, as printing imparts a conventional appearance that too often causes the document in question to be ignored or consigned to the waste basket. Statements should be carefully typewritten on the writer's letter-heads rather than in the form of an unidentified legal brief. The little extra pains taken in the preparation of papers for the attention of Congressional committees is usually amply repaid by their increased impressiveness.

Prospective Committee Meetings.

Three meetings of the tariff committees are scheduled for November, but it is probable that no hearings will be held for the benefit of domestic manufacturers or importers until after Congress convenes, although it is possible that the Ways and Means Committee, which it is understood will assemble in Washington during the week beginning November 9, will give hearings for a few days before the end of the month and will then adjourn for a fortnight or more. Senator Burrow's Sub-committee on Classification of the Senate Finance Committee will give a hearing before the 15th instant, but the only witnesses to be examined will be members of the Board of General Appraisers and Treasury officials. The sub-committee will receive suggestions for changes in classification with a view to removing ambiguities in the present law and also for the purpose of providing specifically for many important articles omitted from the classification of the Dingley act. Senator Hopkins' Sub-committee on Rates of the Senate Finance Committee has announced a meeting here on November 20, but no programme has been adopted. It is understood that the meeting will be limited to executive sessions, at which the work of drafting tariff schedules will be laid out. The two sub-committees headed by Senators Burrows and Hopkins will probably hold joint meetings later on to arrange the basis of the maximum and minimum schedules, which it is now expected will supersede the single column tariff of the present law.

Form of Maximum and Minimum Schedules.

Two schemes are under consideration for the double column tariff. One involves merely the incorporation in the proposed law of a section authorizing the President in his discretion—presumably in the event of discriminations against American commerce—to raise the rates prescribed in the schedules by certain percentages. These percentages will not be uniform as to all paragraphs, but will probably range between 20 and 50 per cent., and the section referred to will specify by number the paragraphs to which the several increases will apply. The alternative plan is to adopt the system followed by France, Germany, Russia and other countries having double column tariffs and which involves the specification of two rates in parallel columns for practically every item. The former scheme involves much less labor on the part of compilers than the latter, but does not admit of the accurate and logical treatment of all items that characterizes the new German tariff, in which all important paragraphs are divided into numerous sub-classifications, to each of which the maximum and minimum rates are adjusted with close reference to the requirements of the domestic industry involved.

W. L. C.

The American Patent Law.—I.

Its Attitude Toward Inventors.

BY JOHN D. MORGAN.*

The United States has the most liberal patent laws of any country in the world, considered from the standpoint of the patentee. The United States has likewise played an exceedingly important part in the great industrial revolution of the past few decades. It is quite true that our patent system had its genesis in the early stirrings of the industrial spirit in England and the first gropings there for a knowledge of the crafts of southern Europe. But the formulation of the distinctively American system, following soon after the institution of our government, preceded in all its important elements and policies the great activities that within the memory of living men have transformed the industrial world and further and necessarily have influenced mightily many departments of life, individual and communal.

Patents and Industrial Development.

It cannot be gainsaid that patents have formed an important factor in bringing about modern industrial conditions. Improvement was inevitable aside from legal stimulus as long as natural resources on the one hand and thinking, comfort loving and power craving man, on the other hand, were brought together. But the swiftness and completeness with which the conquest was accomplished and is still going on find their only explanation in the control of his property which the inventor has through patents.

That the United States, which at the opening of this period was largely an undeveloped and consequently a predominantly agricultural country, should have acquired its prominent place in industrial history cannot be explained apart from the great liberality of its patent laws and the scrupulous care of the courts in administering those laws in the spirit in which they were framed.

Liberal Features of the American Law.

Some of the distinguishing liberal principles of the American law will be set forth in brief. It is true that each of these principles is not peculiarly American, but it is equally true that in the laws of no other country are they brought together and bestowed upon every inventor who chooses to avail himself of them. These points or principles may be stated briefly as follows:

1. *Bringing the inventor himself into communication with the Patent Office.*

This is effected by requiring that the application be filed by him under oath. Protection is thus afforded the inventor against the stealing of his invention, and especially through false filings by others. It further conduces greatly to an accurate and ample disclosure of the true nature of the invention in any particular case. No slight advantage is the personal recognition given to the inventor in the published patent, both for the reputation gained in itself and also for the possible pecuniary rewards either directly from the invention or from the additional earning power which may come there through.

2. *Granting the patent to the prior inventor rather than to the prior applicant.*

This is done by permitting a full hearing for all rival applicants for patent on the same invention on the question of priority of invention, and granting the patent in accordance with the results of the trial.

This feature of the law is of inestimable value to the meritorious inventor who through poverty, ill health, lack of available time, or through other actual disadvantage is slow in bringing his invention to perfection. The elaborate and efficient procedure in the Patent Office gives such an one ample opportunity to present his case, and if entitled to the patent to have it awarded him. Even more than this, if a patent has already been granted to one not the first inventor a second patent will be granted to the true inventor, thus enabling him to appear before the courts on an equal legal footing with the grantee of the first patent.

3. *The careful search as to novelty.*

This search extends through the patents of all im-

portant nations and through the principal scientific publications. The work of the United States Patent Office on this line bears an enviable reputation even in other countries. When the volume of business transacted, together with the numerical limits of the examining corps, is considered, the results attained are entitled to our greatest admiration. The drawing of a patent application, and especially the framing of the claims, is attended with two dangers. On the one hand, the claims must not be drawn too broadly else they will be invalid for lack of the novelty over previous inventions required by law. Nor should the claims be too narrow, as in that case the applicant fails to receive legally that which is actually his. The search at the Patent Office, reported in full to the applicant, is thus a warning and a direction to so present his application as to secure the best possible protection.

With the multitudinous patents which have been issued in many arts it would practically be impossible to draw properly a patent application without such a search, and for such a search to be the private enterprise of the individual applicant would in many cases render the application for patent prohibitively expensive. This search has proved of vast value in framing applications for patent to be filed in countries where there is no novelty search or an inadequate one. It has likewise proved of inestimable value in decreasing litigation. Lastly, to it above all other agencies can be ascribed the possibility of successfully issuing the great number of patents which are taken out in these days of intense industrial activity.

4. *A liberal policy toward pioneer inventors.*

Under this policy, frequently the first to devise means toward a certain end has received a patent covering substantially all such means, and the courts had construed such patents in the same liberal spirit in which Patent Office has granted them. A case in point is that of Professor Bell and the telephone. Such control of a great department of human activity has brought vast pecuniary rewards to many meritorious inventors.

5. *The liberal policy toward improvers.*

This liberal policy toward improvers has gone hand in hand with the generous attitude of the Patent Office and courts toward the great pioneer inventors. It may be generally stated that no inventor is debarred from receiving a patent by reason of the relation of his invention to the prior art on grounds other than that of lack of novelty. It is, of course, required of him that he have passed beyond the limit of mere mechanical skill. When it is recalled that minor inventions are frequently of great pecuniary value, the advantage of this feature will be more clearly appreciated. However, this policy has led to the issuance of vast numbers of overlapping patents. That is, if the invention presented by an inventor in his application is useful and novel, a patent will issue to him therefor, notwithstanding the fact that a machine or apparatus or article constructed, or a method practiced, according to the principles of his patent would infringe one or more prior patents. This does not affect the property rights of any one. The issuance of such patents in no wise affects the scope or status of prior patents, nor on the other hand does the issuance of a patent to the improver change the relation of his machine or other patented thing to prior patents.

6. *The length of monopoly period granted.*

In the United States the period for which a patent is granted is 17 years from the date of issuance of the patent. There is no time limit covering the period of pendency in the Patent Office. All that is required is that the applicant respond within one year to each action by the examiner and that the prosecution of the application be diligent and in good faith. In England 15 months is allowed for prosecuting the application, and the patent runs 14 years from date of issuance. In Germany an applicant is limited to 16 years from the date of filing his application.

7. *The nature of the monopoly.*

That is, the absolute and unqualified property in the invention bestowed upon the patentee for the period of

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the patent. This unqualified property in the invention is signalized by (a) absence of direct taxation upon the patent; (b) absence of a working requirement; and (c) possession of the right of nonuser.

Uniformity of the Patent Policy.

Our patent laws in most of their essential features have been as they now are throughout the period of great industrial development of the last few decades. In fact, in their broad spirit and essential principles they have been a unity from the beginning. The interpretation and application of these laws by the courts have naturally been progressive, but here also the attitude has been consistent and the spirit harmonious with that of the Congress.

The framers of the Constitution bestowed the patent granting power upon Congress in the very broadest terms, as will appear from the following:

The Congress shall have power . . . to promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.

The apt and concise language is admirable. There is a recognition that there would necessarily be some progress in science and the useful arts, even were inventions to become immediately the prey of competitors. There is, however, a further clear recognition of the fact that that progress would be inconsiderable without patent protection and the consequent hope of gain held out to inventors. Therefore the power bestowed on Congress was "to promote the progress" of the arts.

Early Industrial Conditions.

Now that we have outlined the advantages and also the development of the patent law, it might be well to glance for a moment at the industrial conditions that those laws were primarily to meet.

The industry of the time was typified by the individual craftsman, although of course, the machine as an entity had some place in the industrial world. Yet the force to which the constitutional convention and, later, Congress looked to "promote the progress of science and the useful arts" was the individual practicing his craft in its entirety with his own hands and who, while so practicing, from his experience supplemented by the constructive imagination, was able to improve that craft in process, appliance or machine. Congress intended to give him for a few years the exclusive right to his discovery, and then at the end of that time other individuals could also take it up and its benefits thus pass from community to community. They looked, and logically, too, for development not revolution. They thought of patents as distinct and separate things and not, as they are to-day, an interwoven, continuous fabric covering almost entirely that which is greatest and best and most productive in the advance of the industrial arts.

Industrial Development Reflected in Patent Activities.

That Congress had correctly conceived the conditions of the time and of the succeeding decades is shown by the fact that in almost a half century following only about 10,000 patents were issued, or at the average of about 200 a year. As indicating the change in conditions it may be stated that this is about the issue for two consecutive days at the present time! Approximately half the patents issued by the United States have been issued in the last 17 years. In other words, nearly half the issued patents are now alive. The issued patents are more than 900,000 in number; nearly 440,000 of these are in force. Nearly 75 per cent. of all American patents have been issued in the last 30 years.

The Industrial Revolution.

This increase in inventive activity is but one feature of the great industrial revolution that has taken place. The independent craftsman has disappeared. His place has been taken primarily by the great corporation operating through gigantic mills and factories, and the individual finds his place no longer as the craftsman but as the operative. If he be a person of intelligence, skill and judgment, he is yet a specialist in charge of but some small fragment of an art. A great majority of the

human beings involved are operatives of and attendants upon automatic machinery. The relative scarcity of skilled craftsmen is a matter of solicitous discussion at this time, and active steps to remedy this condition are already under way in various quarters.

As a part of this revolutionary change we must consider the vast investments in industrial enterprises. In certain lines success is out of the question except for enterprises and establishments founded and conducted on a vast scale. In many industries and with many enterprises, patents are of the very essence of the situation, while with others patents form an important and valuable element of their assets and earning power. There are, of course, small concerns both in the industrial and patent fields that are prosperous, but the industrial situation is signalized by the conditions just stated.

Another feature of the situation is the vast number of overlapping patents. This is, a patent is issued for an invention which, though novel, is covered by the claims of another living and usually previously issued patent. This is a condition which has been brought about largely through the vast growth and rapid development of the industrial arts. The amount of observation that a particular kind of machine or a particular process undergoes in these days from trained and skilled persons, a large proportion of whom are endowed more or less with the constructive imagination, is a thing unforeseen and undreamed of in the old days of the individual craftsman in a community relatively agricultural. In addition, the multiplying and piling up of new means are cumulative and intensive to the last degree. With all this goes the knowledge by each person involved that through the patent laws he can secure to himself any contribution he may be able to make to the advance of his art.

Had the number interested in each art remained few and widely separated, highly individualistic in skill and experience, the development of the arts would have continued to be slow, and it is likely that patents would be more separate and individualistic and in many cases a patent would have expired before an improvement thereon was patented, or at least there would be relatively few overlapping patents. This would have left an exceedingly simple situation.

The patent law was originally framed by Congress to meet the then foreseen conditions which had been briefly set out and, to some degree at least, they owe their broad and beneficent provisions to the apprehension by early congresses of the meager rewards which inventors can hope for in a sparsely settled country devoted largely to agricultural pursuits. In these latter days, when conditions have been so marvelously and widely transformed that those laws now operate in the richest and most inviting industrial field, gigantic enterprises employing resources inconceivable to the legislators, inventors and manufacturers of a century ago, and requiring proportionately large returns, find in these same liberal provisions of the law one of the chief incentives for their tremendous activities. By a strange and interesting paradox, industrial and patent conditions as far removed from each other as possible within the scope of our conception have their needs fulfilled in these same laws.

The Indestructible Steel Wheel Company, Chicago, which has its plant at Lebanon, Ind., will build a large addition in the winter or spring. The company started in a small way in Chicago two years ago to manufacture pressed steel wheels. The business grew rapidly, and in looking about for a country location in order to expand and also avoid labor troubles, the company selected Lebanon, incorporated with \$50,000 capital stock, and built a plant on a 3-acre site. Last year the capital stock was increased to \$100,000 to meet extension requirements. The factory at present is equipped to turn out 200 sets of wheels a day. The company has just put on the market a 16-in. wheelbarrow wheel. It manufactures all kinds of automobile steel stampings. Harry J. Fish is president; Wm. E. Metzel, vice-president; Wm. J. De Vol, vice-president; Louis A. Lamm, secretary-treasurer.

OBITUARY.

S. D. V. BURR.

Samuel DeVere Burr, for many years a writer on engineering and scientific subjects, and well known among the journalists of the technical press, died of appendicitis at his home in Plainfield, N. J., October 28, aged 53 years. Born in New York City, Mr. Burr moved to Plainfield with his parents and entered the then new Stillman High School. He was a member of the first graduating class, which went out in 1870. Of a mechanical bent, he continued his education at Rutgers College, New Brunswick, N. J., securing the degree of civil engineer from that institution in 1875. He subsequently received the degrees of A. B. and A. M. For about a year he taught school near Freehold, N. J.

Mr. Burr assisted his father in compiling a large two-volume work on the Centennial Exposition, entitled "Four Thousand Years of the World's Progress to the Present Time." Later he contributed to the *Engineering News*, with which he was employed editorially for three years. He was on the editorial staff of the *Scientific American* for six years. For 16 years, from 1888 to 1903, he was mechanical editor of *The Iron Age*. He was connected with the *Metal Industry* for the last three years, and was its managing editor at the time of his death.

As an author, Mr. Burr is known for three works, "Bicycle Repairing," "Tunneling Under the Hudson" and "Rapid Transit in New York and Other Large Cities." The last named book was prepared at the request of the New York Chamber of Commerce. He was a man of wide attainments and exceptional versatility. He was a skillful pianist and a master of photography. An indefatigable student of science in its varied forms, he possessed to an admirable degree the art of applying his mental riches to practical affairs. He was equally at home in civil and mechanical engineering. His work on *The Iron Age* was chiefly in the line of describing machinery, but the columns of the paper were frequently favored with his contributions on other subjects, as well as editorial discussions. He was a lucid writer, and had a peculiarly vigorous and epigrammatic style. He leaves a widow, a married daughter, and a son, Hudson C. Burr, at present a college student.

JOHN ROYLE, senior member of John Royle & Sons, machine builders, Paterson, N. J., died October 31, aged 86 years. He came from England with his parents when he was eight years old. He worked in cotton mills as a boy, and founded the firm in 1840 for the manufacture of force pumps and water wheels. He invented machinery for the manufacture of silk, and became one of the largest builders of this kind of machinery in America.

HUGH KELLY, one of the largest buyers of sugar machinery, died in New York City, October 30. He had lived in New York for 49 years. He engaged in West Indian trade at an early age, and established the present house which bears his name. He founded a number of the largest refineries of cane sugar in the West Indies, and his long experience in mercantile trade in the Caribbean Islands made him one of the best known men in the business. He had important interests also in maritime and municipal affairs.

CYRUS C. CURRIER of the firm of Cyrus Currier & Sons, machinists and manufacturers of special machinery, Newark, N. J., died October 30, at his home in South Orange, N. J. He was born in 1847, and the business which he had been conducting in Newark had been established by his father. Mr. Currier's two brothers were formerly identified with the firm.

OLE JOHNSON, Milwaukee, Wis., well known as an inventor and contractor, died suddenly of heart disease at Duluth, Minn., October 24, aged 54 years. He invented a number of improvements in coal handling machinery, and as a contractor had built large coal docks at Milwaukee and other lake ports. He was born in Norway and located in Milwaukee 28 years ago. He leaves a widow, two sons and a daughter.

GUSTAVE CANET, one of the most famous engineers which France has produced, died at Saint-Aubin-sur-Mer

(Calvados) October 9. Born at Belfast September 29, 1846, he entered the Ecole Centrale des Arts et Manufactures in 1866. As a lieutenant of artillery he was made a prisoner on the surrender of Neuf-Brisach in the Franco-German war and on the conclusion of peace re-entered the practice of his profession, his war experience having decided him to pay particular attention to war material. He entered the London Ordnance Works Company under Vavasseur, and in 1881 returned to France to organize the artillery branch of the Forges de la Mediterranee. When that plant was purchased in 1897 by Schneider & Co., Creusot, he joined that famous firm, retaining an active connection with it until 1907. He took a keen interest in the work of the great engineering societies and was made an honorary member of the Iron and Steel Institute and of the American Society of Mechanical Engineers.

PERSONAL.

John H. Judson has opened an office as a consulting, mining and metallurgical engineer in the Mills Building, New York. He has had a long experience in many branches of the profession.

Charles M. Dally, secretary and treasurer of the European Churchward Steel Company, 29 Broadway, New York, sailed for Europe November 4, expecting to return on or about December 20.

Andrew Carnegie arrived in New York from Europe October 29.

L. G. Finlay has opened an office in the New England Building, Cleveland, Ohio, for the handling of power plant equipment, consisting of steam and gas engines, steam turbines, pumps, &c. He has also been appointed agent for the Slight Feed Oil Pump Company, Milwaukee, Wis.

G. K. McMullen, formerly sales manager of the Fox Machine Company, Grand Rapids, Mich., has tendered his resignation to take effect November 15, and will at that time engage in business for himself, announcement of which will be made later.

George Bartol, general manager of the Otis Steel Company, Ltd., Cleveland, has gone for a two months' trip to England and France.

J. E. Frantz of the Landis Tool Company, Waynesboro, Pa., returned from Europe October 30, after an absence of six weeks.

Albert Ladd Colby, consulting engineer, New York, has returned from Europe after over a year's absence, passed in studying different types of by-product coke ovens and recovery processes and testing American coal in by-product ovens. Until he opens a new office in this city his address will be care Engineers' Club, New York, or South Bethlehem, Pa.

Hugh A. Brown has resigned from the Crocker-Wheeler Company, manufacturer and electrical engineer, to whose Chicago office he has been attached for several years. He now takes up the work of sales manager for the Rockaway Coaster Company, Cincinnati, in which he has a substantial interest.

The Southern Marine Works, Algiers, La., whose shops have been idle for the last six months, has been reorganized and the business taken over by the Union Marine Works, an organization composed of new interests and incorporated with a capital stock of \$50,000. The old shops are being remodeled, and when completed will have a floor space of 187 x 290 ft. The plant is advantageously located for handling ship work, having a river frontage of nearly 600 ft. The officers of the company are as follows: Victor Loisel, president and manager; F. W. Sadler, vice-president; W. J. Tierney, assistant manager; H. Loisel, secretary and treasurer.

The report that the Aluminum Company of America, New Kensington, Pa., had put its plant on double turn is untrue. The company is operating to only partial capacity at present.

Canada's Elections and the Tariff.

TORONTO, October 31, 1908.—The Laurier Government having been sustained in the general elections held on Monday, there is not likely to be any sharp departure from the ideas that have been followed for years in the administration of Canadian affairs. In particular, the fiscal and trade policies may be expected to continue as they were. The present tariff is about as symmetrical a cross between the two leading varieties—a protective tariff and a revenue tariff—as it is possible to produce. How long it may remain thus balanced no one can say, and the Government itself does not pretend to say. It answered the Government's purposes up to the present, but if modifications are found necessary in order to keep it in conformity with those purposes, modifications will be made.

Not a Rigid Tariff Policy.

Readiness to adapt may be taken as the characteristic of the Laurier Government's tariff policy. It is in contrast with the more definite, not to say rigid, policy of the Opposition, which is protection tempered with reciprocity with Britain. If the Laurier Government finds its revenue needs outstripping the returns from its sources of taxation, it will change the tariff so as to make it more productive of revenue. This may involve the correlative change of making the tariff less productive of protection. It is to be remembered, however, that the Liberal party is not pledged to protection; indeed, its platform (drawn up in 1893) declares against protection. In budget speech after budget speech Mr. Fielding, the Finance Minister, has spoken of the tentative character of the tariff and of the more perfect state toward which it was tending. Its protective features were treated as necessary evils.

True, the Laurier Government took steel rails off the free list and made them dutiable at the rate of \$7 a ton, established the anti-dumping duty to penalize importers of bargain price goods, put the high tax on German goods, and went far beyond its predecessor in its use of the bounty system for fostering home industry. But against these things are to be set the lowering in 1897 of the general duties on important staples coming mainly from the United States, the granting of the preference on British goods and on the goods of certain British colonies, the adoption of the intermediate tariff, and the reciprocity treaty with France, as well as the reciprocity negotiations with other European countries. As to which side of the scales the next change will fall Government policy affords no indication. That policy may be described as of the hand to mouth kind.

The Attitude of Manufacturers.

If times do not greatly improve, there will be strong pressure from the manufacturing industries whose chief bulwark for years has been not the tariff, but the absorbing prosperity of the United States. Should trade across the line not greatly improve, this market will have a strong flow of imports from that quarter. Whether trade has or has not a complete revival, the Government will have need of an abundant revenue, for it is committed to tremendous outlays. The promises made in the election campaign cannot be redeemed except by very large annual increases in expenditure. These, of course, call for the raising of new capital, but the annual charges on new capital account will be large. Moreover, such new services as rural mail delivery, which is just being inaugurated, mean large annual deficits in the several departments concerned, which will have to be provided for by increasing the revenue from customs. It is to be expected that tariff changes henceforth will be determined by revenue needs, not by the importunities of manufacturers.

But the manufacturers mean to be as strenuous for protection as ever. At the last annual meeting of their association they made known to the Government their desire to have a permanent Tariff Commission established. Sir Wilfrid Laurier told them, in a speech delivered at their banquet, that he was not averse to having such a commission constituted if it should be on

lines similar to those proposed for a standing Tariff Commission in the United States. On the Government's side a permanent commission always ready for hearings, and on the manufacturers' side an organization always bringing forward cases to show the need of tariff amendment in this point or that, the respective parts of the general public and of Parliament in the business of tariff making would tend to become of minor importance. It is scarcely probable that the association's wishes in this matter will be precisely met.

The Manufacturers' Tariff Expert.

The Manufacturers' Association has a mastery of the tariff question which is not surpassed by that of the Finance Minister. Its Tariff Committee is a very able body, and the tariff facts collected and arranged are handled by the committee to the best effect. Besides, the association has a tariff expert whom the Customs Department will find it difficult to match. He was trained by many years' responsible service in that department, from which he retired last year to take the position the association offered him. He is giving his attention to the undervaluation problem, and the result of his activity is likely to be very telling for strengthening the checks upon violations of the anti-dumping clause. It is undeniable that the anti-dumping duty is being more and more evaded as time and inventiveness render the shifts of traders more proof against detection. The anti-dumping duty did its work fairly well at the outset, but it now misses a large percentage of the business it should be levied upon. It is part of the duty of the association's tariff expert to "confound the knavish tricks" of importers or consignors who have learned how to deceive the customs officials as to values.

If the tariff of the United States is lowered materially in the next revision, or if the principle of reciprocity is made a larger element in shaping the country's foreign trade relations, there can hardly be a doubt that the Canadian Government will be prepared to discuss a *quid pro quo* arrangement with the Washington Government. The intermediate tariff was devised for reciprocity purposes, and Mr. Fielding showed that it is not to be considered a cast iron basis of negotiation, for he made concessions even from its special rates to the government of France.

C. A. C. J.

Trade Publications.

Silica Bricks.—Mount Union Silica Brick Company, Mount Union, Pa. Catalogue. Size, 3¼ x 6½ in.; pages, 36. Deals with high grade silica bricks, and illustrates the numerous sizes of standard shapes, bricks for glass works, roof bricks, regular shapes to be made to order, coke oven crown bricks, and Siemens steel furnace blocks. Several pages contain useful information in the way of rules, tables, temperatures, and weights and measures.

Electric Cranes.—Whiting Foundry Equipment Company, Harvey, Ill. Illustrated booklet dealing exclusively with crane equipment for railroad shops. Views are shown of interesting installations in locomotive repair and boiler shops, railroad machine shops, foundries, car shops, power houses, coaling stations and yards. These include electric traveling cranes of various capacity of the overhead and gantry type, electric transfer tables, hand electric and compressed air pillar cranes and traveling bracket and jib cranes of various types.

Injectors, Ejectors, Check Valves and Jet Apparatus.—Hayden & Derbey Mfg. Company, 85 Liberty street, New York. Catalogue, 6 x 9 in., 51 pages. In the review of this catalogue which appeared in *The Iron Age*, October 22, 1908, the Metropolitan automatic injector was incorrectly referred to as the Manhattan automatic injector.

The George Washington, the first steamship of the North German Lloyd to exceed 20,000 tons gross register, being about 25 per cent. larger than the Kronprinzessin Cecilie and Kaiser Wilhelm II of the same line, was launched at the Stettiner Vulcan yards, Bredow, Germany, October 31, and was christened by David Jayne Hill, United States Ambassador. The George Washington is 722 ft. 5 in. long, 78 ft. beam and has a depth of 54 ft. from the upper saloon deck. The displacement at draft of 33 ft. is 36,000 tons. There are two four-cylinder quadruple expansion engines of 20,000 hp.

Pig Iron Production.

October Output, 1,563,483 Tons.

Active Capacity Makes a Substantial Gain in the Month.

Through the prompt co-operation of the furnace companies we are able to present the monthly statistics of pig iron production within four days of the end of the month. In October the production of coke and anthracite pig iron was 1,563,483 tons, a gain of 145,000 tons over September. The steel works furnaces produced 996,481 tons and the merchant furnaces 567,002 tons. The daily rate for the steel works furnaces was thus 32,144 tons and for the merchant furnaces 18,290 tons, the latter class showing the more pronounced gain. The number of active furnaces showed a net gain of 12 in October, or to 200. The daily rate of production by months for this year is as follows:

Daily Rate of Production.—Gross Tons.			
	Steel works.	Merchant.	Total.
January	21,432	12,286	33,718
February	23,717	11,446	35,163
March	27,145	12,474	39,619
April	24,185	14,104	38,289
May	24,505	13,098	37,603
June	23,923	12,521	36,444
July	25,762	13,525	39,287
August	28,952	14,899	43,851
September	31,117	16,183	47,300
October	32,144	18,290	50,434

October Product by Districts.

The table below gives the production of coke and anthracite furnaces in October and the four months preceding:

Monthly Pig Iron Production.—Gross Tons.					
	June. (30 days)	July. (31 days)	August. (31 days)	Sept. (30 days)	Oct. (31 days)
New York....	61,249	66,498	83,004	108,453	120,191
New Jersey...	15,963	14,830	16,866	16,544	16,790
Lehigh Valley.	26,357	28,028	36,701	42,184	42,782
Schuylkill Val.	23,814	25,115	24,586	23,918	47,210
Lower Susquehanna and Lebanon Val.	31,058	26,204	23,632	24,170	31,304
Pittsburgh Dis.	259,771	303,645	362,417	359,132	387,207
Shenango Val.	58,244	82,978	91,534	93,372	102,953
West. Penn....	59,521	63,433	73,207	72,633	97,052
Md., Va. and Kentucky ...	46,802	46,635	47,492	50,150	51,844
Wheeling Dis.	16,539	19,405	24,368	23,409	25,239
Mahoning Val.	89,238	93,635	103,021	102,606	115,315
Central and North. Ohio..	70,233	92,737	117,016	119,163	119,480
Hocking Valley, Hanging Rock and S. W. Ohio	20,342	20,187	19,909	22,376	21,872
Mich., Minn., Mo., Wis., Colo....	34,363	40,029	35,542	39,408	43,465
Chicago Dist.	153,162	152,981	156,537	167,896	171,732
Alabama	110,196	123,301	122,840	126,137	135,907
Tennessee, Georgia and Texas	15,229	18,488	21,159	27,447	33,140
Totals	1,092,131	1,218,129	1,359,831	1,418,998	1,563,483

Among furnaces blown in in October were Zenith at Duluth, Wickwire at Buffalo, one Swede and Temple in the Schuylkill Valley, one Palmerton in the Lehigh Valley, Soho and Midland in the Pittsburgh district, two Cambria in western Pennsylvania, Bird Coleman in the Lebanon Valley, Globe, Jackson and Marting in the Hanging Rock district, one Gadsden and Williamson in Alabama and one Mayville in Wisconsin.

The list of furnaces blown out in October includes one Bethlehem and Crumwold in the Lehigh Valley, one Carrie in the Pittsburgh district, Upson in northern Ohio, one Ohio in the Mahoning Valley, one Ensley in Alabama and Johnson City in Tennessee.

Production of Steel Companies.

Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Republic, Youngstown Sheet & Tube Company, Jones & Laughlin, La Belle, Bethlehem, Calumet, Inland, Colorado and Tennessee (Ensley) companies

show the following totals of product month by month. We give separately a statement of the output of spiegel-eisen and ferromanganese, which is included for each month in the total production:

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.			Spiegeleisen and ferromanganese.	
	1906.	1907.	1908.	1907.	1908.
January	1,358,015	1,406,397	664,415	21,477	20,254
February	1,226,760	1,317,923	745,802	19,444	9,402
March	1,400,395	1,424,827	841,502	31,091	13,750
April	1,333,591	1,446,788	725,548	26,527	12,363
May	1,372,423	1,470,080	759,674	28,822	17,823
June	1,293,437	1,457,230	717,689	30,942	15,958
July	1,323,391	1,452,557	798,639	25,343	10,250
August	1,237,485	1,445,685	897,052	23,696	14,932
September	1,264,380	1,417,153	933,514	30,270	8,938
October	1,452,200	1,514,521	996,481	35,105	12,174
November	1,411,350	1,084,114	.....	21,861	.....
December	1,445,528	659,459	.....	19,480	.....

Capacity in Blast November 1 and October 1.

In the following table is given the weekly capacity of coke and anthracite furnaces in blast November 1 and October 1, based largely on their performance in the preceding month in each case:

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	November 1.		October 1.	
		Number in blast.	Capacity per week.	Number in blast.	Capacity per week.
New York :					
Buffalo	15	11	24,550	10	23,303
Other New York.	7	3	3,822	3	3,926
New Jersey	8	2	3,724	2	3,855
Spiegel	2	0	0	0	0
Pennsylvania :					
Lehigh Valley...	25	7	8,483	9	9,713
Spiegel	3	2	535	1	130
Schuylkill Valley.	15	7	10,661	5	6,421
Low. Susquehanna	7	2	3,614	2	3,335
Spiegel	1	0	0	0	0
Lebanon Valley..	10	4	3,495	3	2,305
Pittsburgh Dist..	45	32	87,599	31	81,841
Spiegel	3	2	2,555	2	1,956
Shenango Valley.	20	12	23,247	11	20,853
W. Pennsylvania.	27	15	23,044	13	19,047
Maryland	4	2	4,235	2	3,905
Wheeling District..	14	3	5,698	3	5,462
Ohio :					
Mahoning Valley.	18	10	26,045	11	26,507
Central and North. and Michigan..	22	11	28,980	12	28,996
Hocking Valley, Hang. Rock and S. W. Ohio....	14	8	6,590	4	3,603
Illinois and Indiana	24	15	38,780	15	37,208
Spiegel	2	0	0	0	0
Minnesota	1	1	1,530	0	0
Wisconsin	6	2	2,650	1	1,785
Missouri & Colorado	7	4	6,216	4	6,002
The South :					
Virginia	23	10	6,571	9	7,004
Kentucky	5	1	1,106	1	1,050
Alabama	46	23	31,388	22	31,948
Tennessee	18	10	7,077	11	7,220
Georgia & Texas	3	1	490	1	550
Totals.....	395	200	362,685	188	337,925

A Record of Active Capacity.

The active weekly capacity in coke and anthracite iron has shown the following fluctuations since January 1, 1904:

Capacity per week.		Capacity per week.	
November 1, 1908....	362,685	May 1.....	484,031
October 1.....	337,925	April 1.....	484,240
September 1.....	313,112	March 1.....	479,737
August 1.....	284,590	February 1.....	482,156
July 1.....	264,452	January 1, 1906....	463,673
June 1.....	259,284	December 1, 1905....	475,814
May 1.....	268,674	November 1.....	460,449
April 1.....	264,890	October 1.....	445,468
March 1.....	267,437	September 1.....	412,563
February 1.....	241,925	August 1.....	410,088
January 1, 1908....	232,652	July 1.....	408,617
December 1, 1907....	347,372	June 1.....	443,092
November 1.....	491,436	May 1.....	452,031
October 1.....	511,397	April 1.....	439,564
September 1.....	507,768	March 1.....	403,157
August 1.....	513,471	February 1.....	405,792
July 1.....	528,170	January 1, 1905....	377,879
June 1.....	523,220	December 1, 1904....	357,846
May 1.....	524,538	November 1.....	334,249
April 1.....	496,456	October 1.....	319,249
March 1.....	511,035	September 1.....	291,573
February 1.....	492,359	August 1.....	246,092
January 1, 1907....	507,397	July 1.....	272,301
December 1, 1906....	513,860	June 1.....	356,107
November 1.....	500,580	May 1.....	368,244
October 1.....	469,665	April 1.....	337,257
September 1.....	441,426	March 1.....	308,751
August 1.....	449,908	February 1.....	273,692
July 1.....	460,570	January 1, 1904....	185,636
June 1.....	472,622		

Seattle Trade Notes.

SEATTLE, WASH., October 24, 1908.—At a date to be announced in the near future a conference will be held at San Francisco between representatives of Los Angeles, the California and the United Metal Trades associations and the traffic managers of the transcontinental railroads on the subject of securing a greater differential than is at present given in favor of Pacific Coast concerns on sheet metal, structural iron and raw material. The meeting will probably take place within the next two weeks.

The contemplated organization of the foremen in the metal trades in the Oregon jurisdiction, which was to have been effected at a banquet and convention in Portland October 22, was postponed owing to the absence from the State at that time of some of the moving spirits in the undertaking. The organization, however, is expected to be launched within a short time, after which similar steps will be taken in Washington and British Columbia.

A dispatch from Valdez, Alaska, announces that on October 23, following a hard legal fight, the Alaska Central Railroad was again thrown into the hands of a receiver, with O. G. Labaree of Spokane and John Goodwin of Valdez as trustees, qualifying in bonds of \$50,000. John H. Graves, attorney for the applicant in the foreclosure suit, declared in court that Canadian bankers, holding \$3,000,000 of Alaska Central bonds, proposed to complete the road to the Matanuska coal fields immediately in order to retrieve their losses.

As the result of the failure of the White Pass & Yukon Railroad to agree on a satisfactory rate for hauling ore from the Conrad mines on Windy Arm, Alaska, to Skagway, a dispatch from that northern port says that J. N. Riblett of the Riblett Aerial Tramway Company has been making surveys at the instance of Col. J. H. Conrad for the building of a tram over the famous Chilkoot Pass in the manner of the one constructed in 1898. Colonel Conrad declares that the money has been pledged, and that the cost will be about \$400,000. White Pass officials, who began in the spring the construction of a spur from White Horse to the mines on Windy Arm, and completed ore bunkers at Skagway at heavy expense, scoff at the idea of the tram as impracticable. Work on the railroad spur to the mines ceased some time ago.

Activity in railroad work and the running of surveys for new lines continue in the State of Washington. Steel rails are now laid over the summit of the Cascade Mountains on the main line of the Chicago, Milwaukee & St. Paul, and for 15 miles into King County on the west side. Grant, Smith & Co., contractors, have just removed enormous grading outfits from the North Bank road to do heavy filling between Cle Elum and Easton.

Surveyors are reported at work all along the Columbia River above Kennewick, locating the line for the contemplated extension of the so-called North Bank road to a connection with the main line of the Great Northern. Nearly all the dynamos have been installed by the Great Northern in the plant being built at Leavenworth to provide electric power for sending trains through the Cascade tunnel. Men are preparing to wire the tunnel, and the plant will be completed by the first of next year. General Manager J. M. Gruber of the Great Northern, who is now here, has just completed an inspection of this work, together with that of the branch line, 40 miles long, from Moses Coulee in eastern Washington into the Big Bend country, in Douglas County. Mr. Gruber declares that his road is abundantly supplied with cars to meet the demands of any shippers, and that there is no danger of a car famine on that line.

The Seattle Electric Company, operating the street railroad system of this city, is actively hastening preparations for handling the crowds for the Alaska-Yukon-Pacific Exposition next summer. The grounds are on a portion of the campus of the University of Washington, 35 minutes' ride by trolley from the downtown district. New lines are being extended to the fair grounds and additional facilities provided in every way. Considerable rolling stock has been ordered for delivery in the spring.

W. T. P.

Universal Portland Cement.

On Saturday, October 31, a large number of members of the Engineers' Society of Western Pennsylvania made a visit to the plant of the Universal Portland Cement Company, at Universal, Pa., near Pittsburgh. In addition to this plant the company operates one at South Chicago, Ill., and another at Buffington, Ind. The South Chicago plant was the first built. The Pittsburgh plant commenced operations in December, 1907, and has a daily output of 4500 barrels. All the plants are located near blast furnaces of the United States Steel Corporation, of which the Universal Portland Cement Company is a subsidiary, and all use furnace slag, carefully selected from the product of furnaces making Bessemer pig iron, with a mixture of practically pure calcite limestone. On the trip to Universal each member of the party was furnished with a printed description of the process employed, as follows:

"The raw material is stored in separate storage bins at one end of the raw material building. From these bins the stone is fed to Gates gyratory crushers which prepare it for the driers. The stone from the crushers and the slag direct from the storage bins are fed to the driers which are maintained at sufficient temperature to drive off all moisture. From the driers each of the raw materials is conveyed to ball mills where the rolling and impact of forged chrome steel balls reduce them to an extreme fineness.

"From the ball mills the materials are conveyed to separate hoppers from which they are drawn off and properly proportioned by an electrically operated weighing device. The slag and stone now united pass to the tube mills where flint pebbles rolling in a steel drum thoroughly mix and complete the grinding of raw material. The raw mixture is now ready for the process of calcination, which is conducted in rotary kilns 120 ft. long, 7 ft. 6 in. in diameter.

"Leaving the rotary kilns, the burnt clinker passes to the storage pit, where it is cooled and thoroughly cured. It is now ready to be finished and is conveyed to the finishing mill hoppers by electrically operated cranes. Passing through jaw crushers the clinker is fed to Kent mills and then passed over Newago separators. To the fine material leaving the separators is now automatically added the desired quantity of gypsum. This automatic device accurately proportions the quantity of gypsum to a given weight of cement and thus insures uniform setting time.

"Leaving this device the material passes through tube mills similar to those used in finishing the raw material and is conveyed from the tube mills, when ground to the specified fineness, on a belt conveyor, from which it is automatically tripped into the various bins. This belt, almost 1.3 mile long, passes the full length of the stock house, which has a storage capacity of 500,000 barrels. This large capacity insures well aged cement and, owing to the facilities for packing, permits of prompt shipment. An automatic sampling device, taking samples continuously from the finished cement belt, gives the samples on which the various tests for quality are made. Uniformity in the chemical composition of the slag and limestone insures a finished product remarkably uniform in action and color."

Following is the company's total production of Universal Portland cement by years: 1900, 32,443 barrels; 1901, 164,316 barrels; 1902, 318,710 barrels; 1903, 462,930 barrels; 1904, 473,294 barrels; 1905, 1,735,343 barrels; 1906, 2,076,000 barrels; 1907, 2,300,000 barrels; 1908 (estimated), 6,000,000 barrels.

The visitors were taken through all the departments of the plant and returned to Pittsburgh, after having passed an exceedingly interesting and enjoyable day.

The Fostick Machine Tool Company, Cincinnati, Ohio, has appointed Perkins & Frecker, New York, agents for its line of radial drills for New York and vicinity, and Mortimer & Alcorn, Cleveland, Ohio, agents for its complete line of radial drills and horizontal boring, drilling and milling machines for northern Ohio.

NEWS OF THE WORKS.

Iron and Steel.

The Keystone Iron & Steel Company, Pittsburgh, Pa., has asked for a State charter. The applicants are James P. Kelley, Michael B. Kelley, Benjamin Haas and Eugene S. Reilly of Pittsburgh.

The Central Iron & Steel Company has ordered repairs made to its No. 1 furnace at Harrisburg, Pa. It may be started about the middle of the month.

The plant of the Wilkes Rolling Mill Company, Sharon, Pa., is expected to resume operations about November 15, after a shutdown of some months. Its finished product is sheets but it also makes muck bar for the open market.

The Thomas Iron Company, Easton, Pa., has two stacks at Hokendauqua, Pa., in blast, and will probably start one of its Hellertown furnaces in a few days. A third Hokendauqua furnace, which has been out for repairs and improvements, will probably be started early in January.

Zenith Furnace at Duluth, Minn., went in blast October 24.

B Furnace of the Bethlehem Steel Company, South Bethlehem, Pa., went out October 22 for relining.

The New Jersey Zinc Company has put in blast one of its furnaces at Palmerton, Pa.

The Cambria Steel Company, Johnstown, Pa., now has six furnaces in blast, two having been added to the active list in October.

Bird Coleman Furnace of the Lackawanna Steel Company at Cornwall, Pa., was put in blast early in October on merchant pig iron.

The Thomas Furnace Company, Milwaukee, Wis., expected to put its reconstructed and enlarged furnace in blast on Wednesday, November 4.

Of the Ensley Furnaces of the Tennessee Coal, Iron & Railroad Company, No. 1 and No. 6 went out in October. No. 2 was put in blast October 3.

The furnace of the Cranberry Furnace Company at Johnson City, Tenn., has blown out October 4 for relining.

The Clark Steel Hoop Company, Punxsutawney, Pa., has awarded a contract to William Swindell & Brother, German National Bank Building, Pittsburgh, for the erection of a Swindell heating furnace. Workmen are now engaged on its construction and expect to have it completed in a couple of weeks.

General Machinery.

The Connellsville Iron Works, New Haven, Pa., is erecting an addition, 30 x 60 ft., of mill construction, with sheet steel siding and roof, in which it will shortly install new angle shears, plate shears, air compressors, pneumatic tools, &c., which have been bought. The company manufactures mine cars, larries, elevators and other equipment for mines, and this new addition will largely increase its capacity.

A small ice plant has been recently installed at St. Andrews, Fla., by the St. Andrews Ice & Power Company, having cold storage facilities in connection with the plant. The equipment consists of one 10-ton ice machine and generative power machinery furnished by the Columbus Iron Works, Columbus, Ga.

The Star Drilling Machine Company, Portland, Ore., has completed the building of a new plant for the manufacture of portable well drilling machinery and upright steam engines, in which the necessary machinery has been installed. The company expects to begin operations at once.

The Atlantic Hydraulic Machinery Company has been organized to develop turbine pumps of a special design, which will be built for the present by contract. The directors are N. W. Akimoff, 1022 Drexel Building, Philadelphia, Pa.; J. F. Cullen and G. E. Mehring.

The reports of the new shops to be erected in the South by the Armour Car Lines, Chicago, were much exaggerated. The company contemplates erecting a small repair shed somewhere in the South, possibly at Meridian, Miss., the cost of which will be only a few thousand dollars.

The Shelbyville Foundry & Machine Works, Shelbyville, Ind., is running to fullest capacity and reports prospects bright in the engine business. The company is planning the erection of a new building which will about double the present capacity.

The A. Garrison Foundry Company, Pittsburgh, is building a 36-in. motor driven roll lathe for the Sweet's Steel Company, Williamsport, Pa., and a double shear of special design for the Oliver Iron & Steel Company, Pittsburgh, for cutting 16 bolt rods simultaneously.

The Mesta Machine Company, Pittsburgh, has received a contract from the Berger Mfg. Company, Canton, Ohio, for a 28-in. sheet mill and gear drive, and is also rebuilding an old 40 x 60 in. slide valve type of engine, which, however, is not a Mesta, for the La Belle Iron Works, Steubenville, Ohio. This engine will have a new 40 x 60 in. Corliss cylinder with the latest type of valve gearing and governor. It will be used to drive a skelp mill. The latter contract calls for a four weeks'

delivery, but the Mesta Machine Company has workmen engaged day and night in turning out the necessary parts, and expects to make shipment in three weeks, which will be record time for work of this character. The company states that the volume of orders received in the past 30 days is greater than for any corresponding time during the last year.

The Weatherly Foundry & Machine Company, Weatherly, Pa., has purchased machinery, patents, &c., of the H. A. Frantz Mfg. Company, Cherryville, Pa., manufacturer of kerosene, oil and gas engines. The equipment will be moved to Weatherly where the manufacture of gas engines will be started as soon as the machinery can be placed.

The Kelley Electric Machine Company, Buffalo, N. Y., has incorporated with a capital stock of \$25,000 to manufacture the Kelley electric routing machine which is designed for a great variety of work. This machine, which was formerly made by the Stevenson Machine Company, is now manufactured by the new company with increased facilities at 254 Court street. G. W. Francis is president; W. M. Wilson, vice-president and George M. Kelly, secretary and treasurer.

The Evans-McDowell Machinery Company, Syracuse, N. Y., has been incorporated with \$20,000 capital by Harry R. Evans, J. Kenyon McDowell and Wilbur Van Duyn.

The Elmira Machine Works Company, 208 College avenue, Elmira, N. Y., has increased its capital from \$10,000 to \$35,000. The additional capital will be used to increase the facilities and improve the plant. James H. Eastgate is manager.

Power Plant Equipment.

The Mondovi Light & Power Company, Mondovi, Wis., has been incorporated, with a capital stock of \$35,000, the incorporators being B. S. Lockwood, A. D. Alt, Carl J. Holmes and John Pierce.

Application for a Pennsylvania charter has been made by the Erie City Gas Engine Company, Erie, Pa. The applicants are William H. Brown, Alex. Loeb, Max Loeb and J. R. Craid of Erie.

The Neshkoro Light & Power Company, Neshkoro, Wis., has been incorporated, with a capital stock of \$20,000, its purpose being to establish a hydro-electric plant to furnish light and power for small motors to the village, of Neshkoro and Redgranite, the latter village being 10 miles distant from the former. An 80-kw. generator will be installed. The incorporators are E. D. Morse, Gustav Dahlke, Charles T. Dahlke and E. J. Dahlke.

The city clerk of Wenatchee, Wash., will receive bids until November 24 for extensions to the water works, the work to consist of constructing a pumping station, furnishing pump, motor and starting panel, construction of pipe tunnel, &c.

The Board of Trustees of the State Hospital for the Insane at Warren, Pa., will receive bids until November 17 for two 80-hp. natural gas engines and two triplex power pumps of 955 gal. per minute capacity.

W. N. Kratzer & Co., Pittsburgh, have been awarded a contract for a large addition to the plant of the Oil City Boiler Works, Oil City, Pa. The order calls for a steel frame building 180 x 355 ft., to be set on concrete foundations and having brick walls. The building has a central division 60 ft. wide, 48 ft. high, spanned by a 25-ton electric traveling crane, and on each side is a 60-ft. leanto, 34 ft. high, both equipped with 5-ton cranes. A 30-ft. rivet tower with 59 ft. clearance will be at one end of the building, and will contain three 10-ton cranes. About 400 tons of structural material will be required and the building is to be completed about April 1.

Bids will be received at the office of the town clerk, Las Animas, Colo., until November 9, for the construction of a new pumping plant, including building and equipment and for extensions to the present mains, approximately 23,000 ft. of cast iron pipe.

Foundries.

F. C. Hendrickson and others of Cumberland, Md., contemplate the establishment of a steel casting plant.

The Florence Machine Works, Florence, Ala., will build an addition to its foundry, 40 x 80 ft., which it expects to have in operation by December 1.

The Union Machine & Supply Company, Nashville, Tenn., whose foundry was recently destroyed by fire, will rebuild as quickly as possible, but will not be in the market for machinery, as it operates an extensive machine shop and is in a position to build all the machinery required. The new foundry will be electrically operated.

A No. 30 Newton cupola was installed in the Rensselaer Polytechnic Institute, Troy, N. Y., last summer, making the foundry department complete.

The Kutztown Foundry & Machine Company, Philadelphia, contemplates making a number of improvements and additions to its plant at Kutztown, Pa., which will consist of the erection of new buildings and the installation of some little special machinery. The improvements to be made are to be acted upon by the Board of Directors and will depend on the money they appropriate.

Fires.

The plant of the Buehler Machine Company, St. Marys, Ohio, was damaged \$10,000 by fire October 22.

Hardware.

The Carnahan Stamping & Enameling Company, Canton, Ohio, is just completing a large new office building and is starting an addition to its enamel room, 108 x 132 ft. in size. The company is also installing three additional muffle gas producing furnaces of the Houston type, which it expects to have in heat by December 1.

The Universal Paint & Varnish Company, Pittsburgh, has erected a new building, about 40 x 50 ft., of brick and heavy mill construction, three stories high, which has been equipped with electrically operated mixing, grinding and other machinery, besides tanks, &c., for the manufacture of paints and varnishes. The boiler department and storage house is in the rear of this new building. A. B. Pruett, formerly of the Specialty Oil & Paint Company, Pittsburgh, is the head of the new company.

The Reeves Pulley Company, Columbus, Ind., has just completed a new boiler plant, completely isolated from the main factory. This building is 40 x 50 ft., having a concrete floor, corrugated iron siding and composition gravel roof. Two new tubular boilers, 18 x 72 ft., and new stack 52 x 80 ft., have also been installed. In setting these boilers they were placed 40 in. above the grates and the combustion chamber back of the bridge wall was made 5 ft. 6 in. from the boiler to the bottom of the fire brick floor. The boilers are suspended from steel beams so that no weight comes on the brick work. The company has also put in a new heating plant, together with all necessary conveyors, blowers, heaters, pumps, &c.

Miscellaneous.

The Sharon Scale Truck Mfg. Company has been organized and proposes to erect a plant at Sharon, Pa., for the manufacture of a combined truck and scale, under patents granted to E. L. Gage of Toledo, Ohio. The incorporators are E. L. Gage, A. E. Gage of Toledo, C. L. Bishop, William Devlin and C. V. Vinton of Sharon.

The Saunemin Gas Company, Saunemin, Ill., is installing an acetylene gas plant, involving an expenditure of about \$9000, the equipment being furnished by the Acetylene Apparatus Mfg. Company, Chicago.

None of the machinery was destroyed by the recent fire at the plant of the Meyer Furnace Company, Peoria, Ill., and that which was damaged is being repaired. The company is already getting its plant in running order again.

The recent fire at the plant of the Franklin Kalbfisch Company at Waterbury, Conn., only destroyed one of the buildings and not the entire plant. This building is to be reconstructed.

Lieut.-Col. Samuel Garcia Cuellar, adjutant to President Diaz of Mexico, while in Indianapolis, Ind., last week, bought an asphalt plant of Hetherington & Berner of that city, to be shipped in three weeks to the City of Mexico.

The Barcalo Mfg. Company, Buffalo, N. Y., manufacturer of iron and brass bedsteads, is arranging to build a large brick addition to its plant at Kentucky and Tecumseh streets and the Erie Railroad tracks. The new building will be equipped with modern machinery and will increase the capacity 20 per cent.

D. C. N. Collins, consulting engineer, 29 Broadway, New York, has awarded the contract for the reinforced concrete stock house for the Alsen American Portland Cement Company, Alsen, N. Y., to the Turner Construction Company, New York. The plans and specifications cover the design for cement bins 25 ft. high for holding loose cement, and this work is to be finished before January 1.

The Oakland Motor Car Company, Pontiac, Mich., has under construction a new addition to its factory which will enable it to increase its output for 1909 to 1500 cars. It is expected the new building will be completed within the next 60 days.

Vollkommer & Co., Pittsburgh, manufacturers of supplies for enameling concerns, who last week suffered a loss by fire and water, their main building being destroyed, have already commenced operations on the construction of a new building. It will be of steel and brick construction, 60 x 85 ft., and will have double the capacity of the one destroyed. This will be in service in about five weeks, but the firm has made necessary arrangements for caring for its customers' orders, which it can fill without loss of time.

The Empire Machine & Stamping Company, Buffalo, N. Y., has purchased property on Schenk street, North Tonawanda, N. Y., and is considering moving the plant to North Tonawanda and operating on an increased scale.

The Philadelphia Foundry Foremen.—At the October meeting of the Associated Foundry Foremen of Philadelphia and vicinity, held on the 20th, the following officers were nominated to serve during the ensuing year: President, W. A. Perrine, Abram Cox Stove Company, Philadelphia; vice-president, E. H. McCoy, Stanley G. Flagg & Co., Philadelphia; secretary, D. M. Kittenger.

American Bridge Company, Pencoyd, Pa.; treasurer, C. M. Benkert, Fairmount Foundry Company, Philadelphia. These officers will be balloted for at the next regular meeting. Two applications to membership were received and accepted. The subject of the education of apprentices in the foundry was brought before the meeting, and considerable interest was caused by the general discussion which followed of the methods pursued in various shops, the age of apprentices when entering the foundry, difference between shops where day rate and piece work systems are in use, progress of the boy during the years of his apprenticeship and his prospects of becoming an intelligent molder when through his term. A discussion also took place on the methods for manufacturing semisteel.

Mining Machinery in Mexico.

DURANGO, October 27, 1908.—The withdrawal of the obnoxious clause in the new mining law in Mexico has already had a beneficial effect upon the mining industry, which for a year or more has been in a greatly depressed condition on account of the financial upheaval in the United States. The sudden check to the influx of capital for investment in mines, which immediately followed the monetary panic last fall, was severely felt in the mining districts in Mexico. Expenses were cut down, and orders for new machinery in many instances countermanded. The fall in the market price of metals caused the absolute stoppage of the operations of many of the most important companies, notably at Cananea, Sonora, and partially, at Velardeña, Durango, while other copper properties of less note also stopped producing, or greatly curtailed their output. Thousands of workmen were thrown out of employment in the various mining camps thus affected. The situation was a gloomy one at the best, but it was rendered still more serious by the sudden appearance of a new factor in the shape of what was speedily designated an "anti-foreign" clause in the proposed revised mining regulations put forward by the Department of Fomento. This clause expressly prohibited foreign corporations from acquiring mining titles in the republic, the ostensible object being to compel outside companies to organize under Mexican laws.

The minister who is considered responsible for the new law invited full and free discussion and criticism of the measure from the interests likely to be affected by it. The public journals for months gave space to the views of their readers, foreign and native, upon the subject, the general opinion being strongly adverse to the sentiment embodied in the famous "Article 144."

The action of the Government, which has disapproved of the obnoxious clause and struck it out of the new law, has given cause for a feeling of widespread satisfaction among aliens engaged in mining operations throughout the country. This sentiment is finding expression in increased activity in the mining districts, as is shown by the placement of orders for mining machinery which had long been held up pending a settlement of the vexatious question suddenly brought to the front as to the Government's actual attitude toward foreign investors.

The local press of the capital thus reflects the improved conditions since the defeat of the clause referred to: "Although the time has been short since the announcement that the proposed law would be put away, many of the machinery houses report actual sales which had not been anticipated, and at the same time dealers declare that the feeling among the mining element has grown from despondency to optimism."

It was estimated by the Consul-General of the United States in Mexico some little time ago that the total sum of United States capital invested in Mexico in mining and smelting enterprises was no less than \$125,000,000, gold.

The New York Machinery Exchange, 136 Liberty street, New York, has incorporated to manufacture special machinery and to represent manufacturers of machine tools and special machinery. The company will also deal in second-hand machinery. Jesse L. Law is interested.

The Iron and Metal Trades

Heavy Buying of Pig Iron.

A Flood of Inquiries.

Iron Production Largely Increased.

It is yet too early to measure the effect of the election upon the Iron and allied industries which must, of course, participate in the fruits of the encouragement of enterprise in all directions which is generally expected to follow. That consumption of Iron and Metals will increase is conceded by all, and that buying for the future and for stocking up may develop in considerable proportions is expected by many. In those branches in which low prices have been ruling an almost violent buying movement may develop. There are some indications of it in Pig Iron. In other branches, including almost the entire series of Finished products in which prices have been more or less successfully maintained during the last year, there is little inducement to anticipate future requirements, because no advances are expected, and because there is little danger of delays in deliveries during the winter months. The country is bare of stocks, it is true, but manufacturers are in a position to quickly respond to any call for additional goods.

We had occasion to call attention to the fact that in certain districts some large buying had developed in anticipation of the election. It appears now that a good deal of this buying was tempted by concessions, but that it was followed by further sales of magnitude since our last report, at a somewhat better range of prices.

Chicago reports an active market for Pig Iron, with sales aggregating about 50,000 tons, which includes one block of 20,000 tons for shipment through the first half, to an agricultural implement interest. The bulk of the whole business was taken by Northern furnaces who are relatively lower in that district than the Southern producers. Cincinnati estimates that the amount of Iron sold through that market footed up 75,000 tons. There has been some good selling in New England and in the Buffalo District. Our Cleveland correspondent notes sales in that district during the week of about 40,000 tons of Foundry Iron, with large inquiries pending, among which is one for 27,000 tons from a Pipe shop. Pittsburgh reports a number of transactions in Pig Iron, of which the largest authentic sale comprised 10,000 tons of Basic for St. Louis delivery, but rumors credited a large local Steel company with purchases of 30,000 to 40,000 tons of Basic in addition to contracts previously made. Local foundries have bought considerable quantities of Foundry Iron.

From all quarters comes the report of very large inquiries and close testing of the market by large and small consumers for delivery, not only during the balance of the year but also for first and second quarter of 1909.

Additional Steel car orders have come up for consideration, the number needed for four roads being about 6000. There is also new work in volume coming up for the locomotive shops, one system needing 25 new engines. The Grand Trunk Railway has ordered 2000 cars from the Pressed Steel Car Company, Pittsburgh. They will be of especially heavy construction, requiring about 20 tons of various Shapes for each car. The Plates, Shapes, Bars and Axles, amounting to about 40,000 tons, will be furnished by the Carnegie Steel Company.

The leading Structural interest has closed for 5000 tons of Girder and Bridge work for the Atchison, Topeka & Santa Fé, and a Pittsburgh fabricator has secured the contract for 3000 tons of 9-ft. riveted Pipe for Mexico. The Plates and Shapes for a boat to be built at Toledo, 3500 tons, have been awarded.

Bids have gone in and are being considered for 11,000 tons of Shapes for the Chicago City Hall, 9500 tons for the People's Gas Company, 5300 tons for the Blackstone Hotel, 3500 tons for a mercantile building in Chicago and about 8000 tons for the Curtis Building in Philadelphia.

The Metals are stronger. A good volume of business has been done in Copper and Electrolytic closes at 13¼c. to 13½c. cash, with little available at the inside figure.

The production of Pig Iron during October, exclusive of Charcoal Iron, was 1,563,483 tons, a gain over September of 145,000 tons. The daily rate was 50,434 tons, against 47,300 tons during September. We enter November with 200 blast furnaces in operation, whose capacity is rated at 362,685 tons, a gain of 12 furnaces in number and of close to 25,000 tons weekly in capacity.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

Nov. 4, Oct. 28, Oct. 7, Nov. 6.
1908. 1908. 1908. 1907.

PIG IRON, Per Gross Ton:

Foundry No. 2, Standard, Philadelphia	\$16.75	\$16.75	\$16.75	\$19.00
Foundry No. 2, Southern, Cincinnati	15.75	15.75	15.75	20.25
Foundry No. 2, Local, Chicago..	16.50	16.50	16.50	21.50
Basic, delivered Eastern Pa....	16.00	16.00	15.50	18.00
Basic, Valley Furnace.....	13.90	13.85	14.25	18.50
Bessemer, Pittsburgh.....	15.65	15.40	15.90	20.90
Gray Forge, Pittsburgh.....	14.40	14.40	14.40	19.90
Lake Superior Charcoal, Chicago	19.50	19.50	19.50	25.50

BILLETS, &c., Per Gross Ton:

Steel Billets, Pittsburgh.....	25.00	25.00	25.00	28.00
Forging Billets, Pittsburgh.....	27.00	27.00	27.00	30.00
Open Hearth Billets, Phila.....	26.20	26.20	26.20	30.00
Wire Rods, Pittsburgh.....	33.00	33.00	33.00	34.00
Steel Rails, Heavy, at mill.....	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:

Steel Rails, Melting, Chicago...	14.50	14.50	14.75	16.00
Steel Rails, Melting, Phila.....	15.25	15.00	15.00	13.50
Iron Rails, Chicago.....	18.00	18.00	18.00	19.50
Iron Rails, Philadelphia.....	19.75	19.50	20.50	19.00
Car Wheels, Chicago.....	15.25	15.25	15.25	24.50
Car Wheels, Philadelphia.....	15.00	15.00	15.00	19.00
Heavy Steel Scrap, Pittsburgh..	15.50	15.50	15.00	15.50
Heavy Steel Scrap, Chicago.....	15.00	14.00	13.00	14.00
Heavy Steel Scrap, Phila.....	15.25	15.00	15.00	13.50

FINISHED IRON AND STEEL,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia.	1.45	1.45	1.45	1.75
Common Iron Bars, Chicago....	1.50	1.50	1.50	1.78
Common Iron Bars, Pittsburgh.	1.40	1.40	1.40	1.70
Steel Bars, Tidewater, New York	1.56	1.56	1.56	1.76
Steel Bars, Pittsburgh.....	1.40	1.40	1.40	1.60
Tank Plates, Tidewater, New York	1.76	1.76	1.76	1.86
Tank Plates, Pittsburgh.....	1.60	1.60	1.60	1.70
Beams, Tidewater, New York...	1.76	1.76	1.76	1.86
Beams, Pittsburgh.....	1.60	1.60	1.60	1.70
Angles, Tidewater, New York...	1.76	1.76	1.76	1.86
Angles, Pittsburgh.....	1.60	1.60	1.60	1.70
Skelp, Grooved Steel, Pittsburgh	1.45	1.45	1.45	1.70
Skelp, Sheared Steel, Pittsburgh.	1.50	1.50	1.50	1.80

SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, Black, No. 28, Pittsburgh.	2.50	2.50	2.50	2.60
Wire Nails, Pittsburgh.....	1.95	1.95	1.95	2.05
Cut Nails, Pittsburgh.....	1.75	1.75	1.80	2.05
Barb Wire, Galv., Pittsburgh...	2.40	2.40	2.40	2.50

METALS, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York.....	14.00	14.00	13.75	14.50
Electrolytic Copper, New York.	13.75	13.50	13.50	14.37½
Spelter, New York.....	4.90	4.85	4.85	5.50
Spelter, St. Louis.....	4.80	4.70	4.70	5.35
Lead, New York.....	4.35	4.35	4.45	4.60
Lead, St. Louis.....	4.30	4.20	4.30	4.40
Tin, New York.....	30.37½	29.50	29.50	30.60
Antimony, Hallett, New York...	8.00	8.00	7.75	10.50
Nickel, New York.....	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York...	\$3.89	\$3.89	\$3.89	\$4.09

Chicago.

FISHER BUILDING, November 4, 1908.—(By Telegraph.)

It is gratifying to note that on the eve of election the Iron and Steel market exhibits no signs of uneasiness, and while there have been no transactions of significant interest in finished material, a number of important projects now in hand are being carried unhesitatingly forward. Satisfactory progress is being made in negotiations for the construction of four Chicago buildings, structures which will require an aggregate of over 23,000 tons of Steel. The largest of these is the City Hall, calling for 11,000 tons, on which the bids submitted by general contractors have been opened and are now under consideration. Judging from the number of structural enterprises on which estimates are being made up, the outlook for increased activity is quite encouraging. The volume of specifications against Steel Bar contracts for the month of October was highly satisfactory, exceeding by a considerable margin, so far as the principal interest was concerned, that of any previous month in this year. This signifies a larger measure of activity in Steel working plants, especially among the implement makers, who are making up a liberal line of stock for the coming season. No developments are reported in the attitude of railroads respecting engagements for 1909 Rail tonnage, and rolling schedules of the Rail mills are almost wholly dependent upon specifications, which are only fair. Light Rails, however, continue active, which reflects a better degree of activity in lumber and mining operations. Anticipating the possibility of firmer prices after election, a good many melters last week

began covering in a moderate way for anticipated Pig Iron requirements through the first quarter and, in some cases, for the first half of next year. It was observed, however, that there was nothing of a speculative nature in this movement, since all purchases were made on a conservative basis, in the belief that prices would at least not recede materially from the present level. Scrap Iron holds firm, with slight advances on Melting Steel and rolling mill grades.

Pig Iron.—As was foreshadowed by the eagerness manifested in recent inquiries for Pig Iron, a determined buying movement developed last week, which resulted in the transfer of a considerable tonnage of Foundry Iron. It was not so much the aggregate volume of sales as the character of buying that attracted attention. The business was widely distributed, being composed largely of orders ranging from 200 to 500 tons, with occasional lots of 1000 to 1500 tons, it being estimated that a total of around 25,000 tons was placed in this way through the local selling agents. While a large part of the Iron taken was for the first and second quarters of next year, a considerable portion of it was for November and December shipment. Considering the spread of 50c. to \$1 a ton between the price of Northern and Southern furnaces, the fact that the bulk of the business was taken by the former interests occasioned no surprise. There were, notwithstanding, a number of small sales of Southern Iron made for last quarter and first half delivery, but from the nature of these transactions it is believed that they represent brands required for mixtures. It is claimed that \$13, Birmingham, is being strictly maintained on forward business, though it is likely that some of the prompt shipment orders were placed at \$12.50. There are still quite a number of inquiries in the market, among which are some of considerable size, one from a local consumer being for 1500 tons. A good many prospective buyers asked for options on tonnage at present prices good for acceptance after election, but so far as can be learned such propositions were not considered by sellers. At this writing, on Election Day, trading is suspended, awaiting the outcome. The leading producers are unwilling to quote beyond the instant, and prices therefore are largely nominal. Some of the larger consumers were included among the buyers, but only for moderate lots. The Allis-Chalmers Company took a few hundred tons of Lake Superior Charcoal, the Crane Company purchased around 1000 tons, part of which was Southern Silicon, the remainder being Northern Iron, and the leading radiator interest also added to its previous purchases. The following quotations are for November and December delivery, f.o.b. Chicago:

Lake Superior Charcoal,	\$19.50 to \$20.00
Northern Coke Foundry, No. 1,	17.00 to 17.50
Northern Coke Foundry, No. 2,	16.50 to 17.00
Northern Coke Foundry, No. 3,	16.00 to 16.50
Northern Scotch, No. 1,	17.50 to 18.00
Southern Coke, No. 1,	17.35 to 17.85
Southern Coke, No. 2,	16.85 to 17.35
Southern Coke, No. 3,	16.35 to 16.85
Southern Coke, No. 4,	15.85 to 16.35
Southern Coke, No. 1 Soft,	17.35 to 17.85
Southern Coke, No. 2 Soft,	16.85 to 17.35
Southern Gray Forge,	15.35 to 15.85
Southern Bessemer,	15.10 to 15.60
Malleable Bessemer,	17.00 to 17.50
Standard Bessemer,	16.90 to 17.40
Jackson Co. and Kentucky Silvery, 6 %	19.90 to 20.40
Jackson Co. and Kentucky Silvery, 8 %	20.90 to 21.40
Jackson Co. and Kentucky Silvery, 10 %	22.90 to 23.40

(By Mail.)

Billets and Rods.—The demand for Forging Billets is still limited to the small orders required for immediate use, and no inquiries are reported that seem to indicate renewed interest on the part of buyers. The Western market is reported firm, as to price; in fact, the size and character of transactions constituting the present movement offer little incentive to sellers to depart from the regular schedule, which is \$28.50, Chicago. While not much new business in Wire Rods is being entered, specifications against contracts are being furnished with reasonable liberality. We quote the following prices, which are reported to be firmly held: Bessemer, \$33; Basic, \$34; Chain, \$33, all at Pittsburgh.

Rails and Track Supplies.—Business in Light Rails is much more satisfactory, relatively, than in standard sections. The local interest booked one order last week of 2500 tons, and the aggregate for the month exceeded expectations, reaching 8000 tons. Occasional orders for traction Rails are being placed by interurban lines; one of 3500 tons for a Michigan system was secured last week by the Illinois Steel Company, and another lot of 2500 tons is pending. Specifications from the steam roads are only fair, but a lot of 5000 tons was included in the aggregate supplied to the local mill. No orders for notable quantities of Spikes and Bolts are being placed, but a fair number of scattered lots is being taken by the roads which invariably insist upon prompt shipments. The position of the railroad interests, respecting the purchase of track material and supplies, is apparently unchanged, and there is no disposition in any quarter to anticipate future needs. Light Rail prices are reasonably firm in the West, where, as a rule, they are not shaded more than \$1 a ton, but in Southern territory competition has forced more liberal concessions. We quote as follows: Angle Bars, accompanying Rail orders, 1908 delivery, 1.50c.; car

lots, 1.60c.; Spikes, 1.80c. to 1.90c., according to delivery; Track Bolts, 2.15c. to 2.20c., base, Square Nuts, and 2.30c. to 2.35c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 25 to 45 lb., \$26; 20-lb., \$27; 16-lb., \$28; 12-lb., \$29. Standard Sections, \$28, f.o.b. mill, full freight to destination.

Structural Material.—The leading transaction in the local market was the opening of bids on Monday for the construction of the new City Hall, for which 11,000 tons of Structural Shapes will be required. Ten bids were submitted, the lowest, \$3,295,000, being that of the Noel Construction Company, Baltimore, the only outside competitor. The next in order were the Alling Construction Company, Chicago, \$3,333,333; Thompson-Starrett Company, Chicago, \$3,370,000; John Griffiths & Sons, Chicago, \$3,436,000, and Wells Bros. Company, Chicago, \$3,437,000. At this writing no award of the contract has been made, but it is understood that owing to irregularity in tenders, there is some doubt as to whether the business will go to either of the two lowest bidders. Figures are in on the Blackstone Hotel, 3000 tons, and the office building of the People's Gas Light & Coke Company, 9500 tons. For the *Dry Goods Reporter* building, to be erected by Lucius G. Fisher, 500 tons of fabricated material was taken by the Morava Construction Company. Among the smaller transactions closed were 100 tons for a power house to be built by the Bisbee Naco Water Company, Bisbee, Ariz., and 110 tons for a Denver hotel, both of which were taken by the Minneapolis Steel & Machinery Company; six steel grain tanks amounting to 100 tons which went to the El Paso Foundry & Machine Company, and three small bridges for California points which were distributed between the Belfountain Bridge Company, Belfountain, Ohio; Clinton Bridge & Iron Works, Clinton, Iowa, and the Union Iron Works, Los Angeles, Cal. Among a number of miscellaneous orders taken by the American Bridge Company were 125 tons from the U. S. Smelting Company for an auxiliary building, Birmingham, Utah, and 225 tons for a warehouse at Salt Lake City. In addition to the improvement already realized in the demand for Structural Material, there is a notable increase in inquiries embracing a large variety of work which seems destined to develop a considerable amount of business in the near future. The local mill is well supplied with specifications to keep it busy well through the present month. Prices from store are 1.95c. to 2c. Mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.78c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.78c.; larger than 6 in. on one or both legs, 1.88c.; Beams, larger than 6 in. on one or both legs, 1.88c.; Beams, larger than 15 in., 1.88c.; Zees, 3 in. and over, 1.78c.; Tees, 3 in. and over, 1.83c.

Plates.—There has been some improvement in the general demand for Plates, but it is by no means as forward as in some other mill products. The most important new tonnage has come from recent orders placed for cars and a growing volume of Structural business; as a result there is more doing in Universal than in Sheared Plates. The general run of orders comprises only the actual requirements of work in hand, and, in this respect, evidences no change in the attitude of buyers. Nor has there been any modification of the situation as to prices, which are still subject to some irregularity, occasioned by the willingness of a few mills to concede from \$1 to \$2 a ton from the regular schedule, especially on narrow sizes. We quote mill shipments as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.78c.; 3-16 in., 1.88c.; Nos. 7 and 8 gauge, 1.93c.; No. 9, 2.03c.; Flange quality, in widths up to 100 in., 1.88c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.88c.; Flange quality, 1.98c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2c. to 2.10c.; from 72 to 96 in. wide, 2.10c. to 2.20c.; 3-16 in. up to 60 in. wide, 2.10c. to 2.25c.; 72 in. wide, 2.30c. to 2.40c.; No. 8, up to 60 in. wide, 2.10c. to 2.15c.; Flange and Head quality, 0.25c. extra.

Sheets.—The past week or two has advanced the position of the mills very little so far as increase in new business is concerned, but, withal, there has been no appreciable diminution of demand from the Western trade, which is supplying a fair amount of new business in which Galvanized Sheets predominate. It is believed that some orders that would otherwise have been placed have been held up pending the results of the election, and on this account a little more activity is looked for in the next week or two, in any event. Prices on light Black Sheets are reported to be fairly well maintained and are somewhat firmer on Galvanized, though some mills are yet shading regular prices from \$1 to \$2 a ton on desirable orders. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 1.98c.; No. 12, 2.05c.; No. 14, 2.08c.; No. 16, 2.18c.; Box Annealed, Nos. 17 to 21, 2.43c.; Nos. 22 to 24, 2.48c.; Nos. 25 and 26, 2.53c.; No. 27, 2.58c.; No. 28, 2.68c.; No. 29, 2.78c.; No. 30, 2.88c.; Galvanized Sheets, Nos. 10 to 14, 2.63c.; Nos. 15 and 16, 2.83c.; Nos. 17 to 21, 2.98c.; Nos. 22 to 24, 3.13c.; Nos. 25 and 26, 3.33c.; No. 27, 3.53c.; No. 28, 3.73c.; No. 30, 4.23c.; Black Sheets from store: Blue

Annealed, No. 10, 2.15c.; No. 12, 2.20c.; No. 14, 2.25c.; No. 16, 2.35c.; Box Annealed, Nos. 18 to 21, 2.60c.; Nos. 22 to 24, 2.65c.; No. 26, 2.70c.; No. 27, 2.75c.; No. 28, 2.85c.; No. 30, 3.25c.; Galvanized from store: Nos. 10 to 16, 3c.; Nos. 18 to 20, 3.15c.; Nos. 22 to 24, 3.30c.; No. 26, 3.50c.; No. 27, 3.70c.; No. 28, 3.90c.; No. 30, 4.40c. to 4.45c.

Bars.—The most favorable conditions to be found in any division of the market are presented in the demand for Steel Bars. While there is comparatively little new business, specifications are coming out in satisfactory volume, so that the Bay View mills of the Illinois Steel Company are now running practically full. Specifications received by this interest for October amounted to 18,000 tons in addition to which 7000 tons of new business was entered. The independent mills in this district continue partially active. The demand for Bar Iron holds fairly even, and consists mainly of small lots required to meet present needs. Specifications against contract are subject to the same restrictions. The mills are, therefore, unable to anticipate rolling schedules far in advance. No deviation from regular prices on Steel Bars is reported, and Bar Iron likewise is held with reasonable firmness. Quotations, Chicago, are as follows: Steel Bars, 1.58c., with half extras; Iron Bars, 1.50c.; Hoops, No. 13, and lighter, 1.98c., full extra Hoop card; Bands, No. 12 gauge, and heavier, 1.58c., half extra Steel Bar card; Soft Steel Angles and Shapes, 1.68c., half extras. Store prices are as follows: Bar Iron, 2c. to 2.15c.; Steel Bars, 1.90c. to 2c.; Steel Bands, 1.90c., as per Bar card, half extras; Soft Steel Hoops, 2.25c. to 2.35c., full extras.

Merchant Pipe.—Through August, September and October there has been practically no variation in the totals representing the business of the leading interest for these months. The demand continues even, not only in amount, but in character as well. Jobbers' purchases are measured by the estimated consumptive demand of 30 to 60 days ahead, with no allowance for requirements beyond that time. The following mill discounts are quoted: Black Pipe, $\frac{3}{4}$ to 6 in., 73.2; 7 to 12 in., 70.2; Galvanized, $\frac{3}{4}$ to 6 in., 63.2. These discounts are subject to one point on the base. From store, in small lots, Chicago jobbers quote 73 per cent. on Black Steel Pipe, $\frac{3}{4}$ to 6 in. About three points above these prices is asked for Iron Pipe.

Boiler Tubes.—Locomotive Tubes are moving fairly well under the increased requirements for repair work. It is observed, however, that orders include only what is absolutely required for the equipment of engines actually needed for present service. The railroads, in other words, have not begun to buy or replenish their storehouse stocks in anticipation of future needs. Merchant Tubes are extremely inactive, and mill shipments are especially light since jobbers' stocks are largely depended upon for the supply of current wants. Mill quotations for future delivery, on the base sizes, are as follows: 2 $\frac{3}{4}$ to 4 $\frac{1}{4}$ in., inclusive, Steel Tubes, 63.2; Iron, 50.2; Seamless, 50.2; 2 $\frac{1}{2}$ in. and smaller, and lengths over 18 ft., and 2 $\frac{1}{2}$ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1 $\frac{1}{2}$ in.	35	35	35
1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ in.	50	35	35
2 $\frac{1}{2}$ in.	52 $\frac{1}{2}$	35	35
2 $\frac{3}{4}$ to 5 in.	60	47 $\frac{1}{2}$	47 $\frac{1}{2}$
6 in. and larger.	50	35	..

Merchant Steel.—Within the past two weeks some slowing up in Merchant Steel specifications has been noted, but no especial significance is attached to this tardiness, except that it points to temporary hesitation, which it is believed will disappear after this week. General conditions seem to afford encouragement, in that there is a noticeable tendency on the part of jobbers to order a little further ahead than they have been doing. We quote as follows: Planished or Smooth Finished Tire Steel, 1.78c.; Iron Finish, up to 1 $\frac{1}{2}$ x $\frac{1}{2}$ in., 1.73c., base, Steel card; Iron Finish, 1 $\frac{1}{2}$ x $\frac{1}{2}$ in. and larger, 1.58c., base, Tire card; Channels for solid Rubber Tires, $\frac{3}{4}$ to 1 in., 2.08c., and 1 $\frac{1}{4}$ in. and larger, 1.98c.; Smooth Finished Machinery Steel, 2.08c.; Flat Sleigh Shoe, 1.63c.; Concave and Convex Sleigh Shoe, 1.83c.; Cutter Shoe, 2.05c.; Toe Calk Steel, 2.13c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7 $\frac{1}{4}$ c. to 8c., and still higher prices are asked on special grades. Cold Rolled Shafting on contracts for 100 tons and over 57 per cent. off; 56 per cent. off in car lots; 52 per cent. in less than car lots, on which carload freight is allowed within base territory.

Cast Iron Pipe.—In the absence of any purchases of round lots last week, business was made up chiefly of small orders, those entered by the leading interest amounting to around 2000 tons. The city of Helena, Mont., let a general contract for the construction of a new water works, which included 3500 tons of Pipe, to the American Light & Water Company, Kansas City, Mo. It is expected that the city of Detroit will come into the market about the middle of the month for about 3700 tons. The foundries, though not running to full capacity, are fairly well employed. We quote nominally per ton, Chicago, as follows: Water Pipe, 4 in., \$27; 6 to 12 in., \$26; 16 in. and up, \$25, with \$1 extra for Gas Pipe.

Metals.—The improved demand noted in last week's

report was followed up by still more liberal buying which embraced a number of good contracts from leading consumers covering deliveries extending through November and December, with a few as far ahead as February. Under the stimulus of this demand Copper prices hardened and registered an advance of at least a quarter of a cent a pound. Lead also, which for some weeks has been sluggish and weak, moved up 20 cents per 100 lb. Spelter likewise shared in the general advance although to a less extent. Following the wake of Ingot Metal, Old Metals are in better demand at slightly advanced prices. Quotations are as follows: Casting Copper, 14c.; Lake, 14 $\frac{1}{4}$ c. to 14 $\frac{1}{2}$ c., in car lots, for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{3}{8}$ c. higher; Pig Tin, car lots, 32 $\frac{1}{2}$ c.; small lots, 34 $\frac{1}{2}$ c.; Lead, Desilverized, 4.55c. to 4.65c., for 50-ton lots; Corroding, 4.80c. to 4.90c., for 50-ton lots; in car lots, 2 $\frac{1}{4}$ c. per 100 lb. higher; Spelter, 4.90c.; Cookson's Antimony, 10 $\frac{1}{2}$ c., and other grades, 9 $\frac{1}{4}$ c. to 10 $\frac{1}{4}$ c.; Sheet Zinc is \$7, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 13 $\frac{1}{4}$ c.; Heavy Copper, 13 $\frac{1}{2}$ c.; Copper Bottoms, 12 $\frac{1}{4}$ c.; Copper Clips, 13 $\frac{1}{2}$ c.; Red Brass, 12 $\frac{1}{4}$ c.; Yellow Brass, 9 $\frac{1}{4}$ c.; Light Brass, 7c.; Lead Pipe, 4.35c.; Zinc, 3 $\frac{1}{4}$ c.; Pewter, No. 1, 21c.; Tin Foil, 23c.; Block Tin Pipe, 25c.

Old Material.—All of the tonnage offered by the railroads last week was promptly taken at good prices, which in some instances exceeded the outside figures of current quotations. There is plenty of material stored in dealers' yards, but it is in strong hands, and is being resolutely held for higher prices, which the holders confidently expect will be realized within reasonable time. Under these circumstances, therefore, the market is dependent upon the daily outcome from original sources for the current supply. Inasmuch as the railroads, which are the principal producers, are tendering less than the normal quantity of Old Material and the consumption is slowly but steadily growing, the situation from the sellers' viewpoint seems to favor an upward tendency in values. The mills are taking Wrought Scrap freely and other mill grades are in good demand. Heavy Melting Steel has firmed up 50c. a ton as a result of liberal purchases by Open Hearth melters whose inquiries indicate further needs. The entire list is, in fact, stronger this week, with a positive advance of from 25c. to 50c. a ton on the majority of items quoted. Several small lists are offered by the railroads for closure on Wednesday. These include 2000 tons from the Chicago & Northwestern, 450 tons from the Omaha line, 600 tons from the Michigan Central, and 300 tons from the Wisconsin Central. A recent sale of 1100 tons of Relaying Rails by a Western road is said to have been made on a basis of \$23, Chicago. The following prices are per gross ton, f.o.b. Chicago:

Old Iron Rails	.....	\$18.00 to \$18.50
Old Steel Rails, rerolling	.....	16.25 to 16.75
Old Steel Rails, less than 3 ft.	.....	14.50 to 15.00
Relaying Rails, standard sections, subject to inspection	.....	22.50 to 23.50
Old Car Wheels	.....	15.25 to 15.75
Heavy Melting Steel Scrap	.....	15.00 to 15.50
Frogs, Switches and Guards, cut apart	.....	14.25 to 14.75
Mixed Steel	.....	10.25 to 10.75

The following quotations are per net ton:

Iron Fish Plates	.....	\$16.75 to \$17.25
Iron Car Axles	.....	20.00 to 20.50
Steel Car Axles	.....	17.50 to 18.00
No. 1 Railroad Wrought	.....	14.00 to 14.50
No. 2 Railroad Wrought	.....	13.00 to 13.50
Railway Springs	.....	13.00 to 13.50
Locomotive Tires, smooth	.....	13.25 to 13.75
No. 1 Dealers' Forge	.....	11.00 to 11.50
Mixed Bushing	.....	8.25 to 8.75
Iron Axle Turnings	.....	8.00 to 8.50
Soft Steel Axle Turnings	.....	8.00 to 8.50
Machine Shop Turnings	.....	8.00 to 8.50
Cast Borings	.....	6.50 to 7.00
Mixed Borings, &c.	.....	6.50 to 7.00
No. 1 Mill	.....	8.00 to 8.50
No. 2 Mill	.....	7.00 to 7.50
No. 1 Rollers, cut to Sheets and Rings	.....	9.00 to 9.50
No. 1 Cast Scrap	.....	13.50 to 14.00
Stove Plate and Light Cast Scrap	.....	12.00 to 12.50
Railroad Malleable	.....	13.00 to 13.50
Agricultural Malleable	.....	11.50 to 12.00
Pipes and Flues	.....	10.25 to 10.75

W. G. Murray, formerly engaged with the David Evans & Co. Pig Iron selling agency, has accepted a position as salesman with the Chicago agency of Matthew Addy & Co., in the Rookery Building.

Raising into position in one piece a steel stack 72 in. in diameter and 105 ft. high, weighing between 18 and 20 tons, is a feat recently performed at the Crocker-Wheeler Company's plant at Ampere, N. J. The stack is a temporary one in the sense that it will be displaced when future demands require extending the boiler plant to the final capacity the design contemplates, 4800 boiler hp. The present capacity under natural draft is 800 hp., with an ultimate capacity under artificial draft of 1600 hp. The stack was built by the Dover Boiler Works, Dover, N. J., and was designed and erected by Walter Kidde, engineer and constructor, New York City.

Pittsburgh.

PARK BUILDING, November 4, 1908.—(By Telegraph.)

Pig Iron.—The largest sale of the week was 10,000 tons of Basic, bought by a St. Louis manufacturer of Steel Castings for first half of next year at about \$17, delivered, St. Louis. This Iron is said to come from Columbus, Ohio, netting the seller about \$14.50, at furnace, the freight to St. Louis being \$2.50 a ton. Had the Iron been sold by a Valley furnace it would have netted \$13.90 to the furnace, the freight thence to St. Louis being \$3.10 a ton. There are also reports that the Pittsburgh Steel Company has bought from 30,000 to 40,000 tons more of Basic, all for delivery this year, at an average of about \$13.90, at Valley furnace, but this is not officially confirmed. There have been several smaller sales of Basic for this year's delivery at \$13.85 and up to \$14, at Valley furnace. We note a sale of 500 tons of Bessemer for November and December shipment at \$14.75, Valley furnace. The Standard Mfg. Company has bought about 2000 tons of Southern No. 2 Foundry for its Louisville Works and the Westinghouse Electric & Mfg. Company has bought some tonnage of Northern No. 2 Foundry. Prices on Bessemer and Basic seem to be a little firmer. We quote Bessemer for prompt shipment at \$14.75; Basic, \$13.90 to \$14; Malleable Bessemer, \$14.25 to \$14.50; No. 2 Foundry, \$14.50, and Forge, \$13.50, all at Valley furnace, the rate to Pittsburgh being 90c. a ton.

Steel.—Some small sales of Billets and Sheet and Tin Bars are still being made by outside mills at 50c. to \$1 a ton under prices of the large Steel manufacturers who, we are advised, are adhering rigidly to regular prices. New orders are light, and for small quantities only, most regular consumers being covered by contract. We quote Bessemer and Open Hearth Billets, 3 $\frac{1}{4}$ in. and larger, up to and including 0.25 carbon, \$25; 0.26 to 0.60 carbon, \$1 extra; over 0.60 carbon, \$2 extra, all f.o.b. Pittsburgh. For Wheeling, Martins Ferry, Follansbee, Newcastle, Sharon, Steubenville and Washington (Pa.) delivery, half the freight, or 50c. additional, is charged. Sheet and Tin Bars in random lengths are \$27.50, f.o.b. Pittsburgh. Forging Billets take \$2 advance over Rolling Billets.

(By Mail.)

With the election out of the way, it is not unlikely there will be a moderate increase in business in the Steel trade. It is known that quite a number of orders for material of different kinds have been held up pending the result of the election, but reports of large contracts for Rails and Cars to be placed at once in the event of Taft's election are much exaggerated and, in most cases, untrue. It is expected that within a short time a number of the leading railroads will be in the market for a large tonnage of Rails for 1909 delivery, but few orders are expected to be placed for shipment this year. The local situation has been extremely quiet for the past few days, and the active inquiry for Basic and Foundry Pig Iron, noted in this report in the last two or three weeks, has quieted down to some extent, but while prices of Pig Iron are not actually higher the tone of the market is firmer. Reports are that the Pittsburgh Steel Company has again been a heavy buyer of Basic for delivery this year, being credited with buying upward of 40,000 tons, part of this coming from the valleys and part from other districts. A Western interest has also bought 10,000 tons of Basic for delivery next year, and there have been smaller sales, aggregating 5000 to 10,000 tons. The demand for Bessemer Iron is quiet, but for Foundry Iron is fairly active. The Westinghouse Electric & Mfg. Company has bought a fairly large tonnage, and the Standard Sanitary Mfg. Company has bought some Southern No. 2 for delivery at its Louisville, Ky., works. The Steel market is quiet, and on the small amount of business that is coming in the market several of the outside Steel concerns that are not among the largest producers occasionally take contracts for a few hundred tons of Billets, Sheet or Tin Bars and furnish this Steel at \$1 a ton or thereabouts less than is charged by the larger interests. The tonnage is insignificant, however, as the leading consumers of Steel have their regular sources of supply and for reasons of policy do not go out in the open market. The volume of business in Finished Material is holding up pretty well, orders booked in October showing an increase over September, and shipments by the mills were also heavier. Some large contracts for Structural Steel have been placed, mostly in Chicago and New York, and considerable business is pending. The Wire trade is heavy, actual orders entered by the leading interests in October being the largest in any one month in this year. There is more inquiry in the Coke trade, and prices for prompt Coke are higher. The Scrap trade is active, and the demand for Heavy Steel Scrap seems to be heavier just now than the available supply, with the result that prices are very firm.

Ferromanganese.—The quotation of \$42 in this report last week on 80 per cent. Ferro for prompt shipment was a typographical error. The market on prompt Ferro is about \$42.75, seaboard, a local interest reporting a sale of 50 tons at that price, equal to \$44.70, Pittsburgh. On Ferro for delivery over first quarter and first half of next year, \$43, sea-

board, or \$44.95, Pittsburgh, is quoted, and the market is firm at this price.

Ferrosilicon.—Prices continue weak, and we note a sale of 50 tons for November and December at \$64, Pittsburgh.

Wire Rods.—Not many orders for Rods are being placed, but the trade is specifying freely against contracts, and the mills are shipping out a heavier tonnage than for some time. Prices are firm, and we quote Bessemer Rods at \$33, Chain Rods \$33 and Basic \$34, Pittsburgh.

Muck Bar.—The market is quiet, the only sale reported being one of 350 to 400 tons at about \$25, Pittsburgh.

Skelp.—A local producer of Skelp has contracted with a Pipe mill for a fairly large Iron tonnage, to be used in making Iron Pipe. Prices are nominally as follows: Grooved Steel Skelp, 1.45c. to 1.50c.; Sheared Steel Skelp, 1.50c. to 1.60c.; Grooved Iron Skelp, 1.60c. to 1.70c., and Sheared Iron Skelp, 1.70c. to 1.75c., f.o.b. Pittsburgh.

Steel Rails.—Orders for both Standard Sections and Light Rails in the past week were very light. It is a notable fact that probably more than half of the limited output of the Carnegie Steel Company's Edgar Thomson mill for some months has been Rails for export shipment. This company is making regular shipments of Rails to Japan and other countries, aggregating a considerable tonnage. Prices on Light Rails rolled from Billets, which are still being shaded from \$1 to \$2 a ton for Re-rolled Rails, are as follows: \$25 for 25 to 45 lb. Sections, with \$1 advance for 20 lb., \$2 advance for 16 lb., and \$3 advance for 12 lb. Standard Sections are \$28, at mill, and Angle Splice Bars, 1.65c., at mill.

Plates.—The South & Western Railroad has placed an order with the Pressed Steel Car Company for 2200 Steel gondola cars, and we understand the Plates and Shapes will be furnished by a local mill. A Western road is in the market for 500 Steel cars, and a Virginia road for 1500 Steel gondola cars. Both these contracts are expected to be placed soon. The court now has the papers in the Brooklyn water works job, and is expected to render a decision in a short time. This contract calls for about 19,000 tons of Plates for lock bar Pipe. If it is placed with the T. A. Gillespie Company of this city, the Plates will be rolled by the Carnegie Steel Company, which has also taken a contract for 3500 tons of Plates and Shapes for a boat to be built for the Ranney interests by the Toledo Shipbuilding Company. The general demand for Plates is quiet, practically no orders being received from the local Steel car companies. Prices on Plates continue to be shaded, mostly on the narrow sizes, from \$1 to \$2 a ton. Regular prices on Plates are as follows: Tank Plates, $\frac{3}{4}$ in. thick, 6 $\frac{1}{4}$ in. up to 100 in. wide, 1.60c., base, at mill, Pittsburgh. Extras over this price are as follows:

Tank, Ship and Bridge quality, $\frac{1}{4}$ -in. thick on edges, 106 in. wide, down to but not including 6 in. wide, is taken as base.

Steel Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered $\frac{1}{4}$ -in. Plate. Steel Plates over 72 in. wide must be ordered $\frac{1}{4}$ -in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel Plates over 72 in. wide ordered less than 11 in. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on Plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under $\frac{1}{4}$ -in. to and including 3-16-in. Plates on thin edges.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Firebox Steel Plates..	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Locomotive Firebox Steel.....	.50
Shell grade of Steel is abandoned.	
For widths over 100 in. up to 110 in.....	.05
For widths over 110 in. up to 115 in.....	.10
For widths over 115 in. up to 120 in.....	.15
For widths over 120 in. up to 125 in.....	.25
For widths over 125 in. up to 130 in.....	.50
For widths over 130 in.....	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.50c., f.o.b. Pittsburgh.

Structural Material.—The American Bridge Company has taken about 5000 tons of bridge and girder work for the Atchison, Topeka & Santa Fé. Bids will go in this week on the new building for the Curtis Publishing Company, Philadelphia, 8000 to 10,000 tons. The McClintic-Marshall Construction Company has taken about 1000 tons for a new hotel at San Antonio, Texas; W. N. Kratzer & Co., 350 tons, for an extension to the Oil City Boiler Works; the Penn Bridge Company, Beaver Falls, Pa., about 500 tons for the new foundry building of the Standard Sanitary Mfg. Company at New Brighton, Pa.; the Fort Pitt Bridge Works, about 3000 tons of bridge work for the New York Central, and the Riter-Conley Mfg. Company a contract for some extensions to Steel buildings of the National Malleable Castings Company at Sharon, Pa. A good deal of work is pending and is expected to come out shortly. Complaints are still heard of the low prices at which work is being taken, and it is claimed that some large jobs have been placed at practically actual cost. We quote, f.o.b. mill, Pittsburgh:

I-Beams and Channels, 3 to 15 in., inclusive, 1.60c., net; I-Beams over 15 in., 1.70c., net; H-Beams over 8 in., 1.80c.; Angles, 3 to 6 in., inclusive, $\frac{1}{4}$ in. and up, 1.60c., net; Angles, over 6 in., 1.70c., net; Angles, 3 x 3 in. and up, less than $\frac{1}{4}$ in., 1.50c., base, half extras, Steel Bar card; Tees, 3 in. and up, 1.65c., net; Zees, 3 in. and up, 1.60c., net; Angles, Channels and Tees under 3 in., 1.50c., base, half extras, Steel Bar card; Deck Beams and Bulb Angles, 1.90c., net; Hand Rail Tees, 3c., net; Checkered and Corrugated Plates, 3c., net.

Sheets.—No improvement is seen in orders for Sheets, the demand being small and mostly for Corrugated and Galvanized. Prices are reported firmer, any concessions now being made not being over \$1 to \$2 a ton and confined largely to Galvanized Sheets. For shipment from mill, regular prices, which are shaded on large orders by some mills from \$1 to \$2 a ton, are as follows: Blue Annealed Sheets, No. 10 and heavier, 1.80c.; Nos. 11 and 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 2c.; Box Annealed, Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.60c.; No. 30, 2.70c. Galvanized Sheets, Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.65c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.70c.; No. 30, 3.95c.; No. 28, Painted Roofing Sheets, \$1.75 per square, and Galvanized Roofing Sheets, No. 28, \$3.10 per square, for $2\frac{1}{2}$ -in. corrugations. These prices are subject to a rebate of 5c. per 100 lb. to the large trade under the usual conditions, jobbers charging the usual advances for small lots from store.

Tin Plate.—The demand for Terne Plate is about over for this season, but for Bright Plate is quite active, the American Sheet & Tin Plate Company having recently entered some very heavy orders from leading salmon packers for delivery prior to March 1, while part has gone to outside mills. We are advised that prices on Coke Plate are very firm, full prices being realized on all the large orders recently placed. The American Sheet & Tin Plate Company has started five hot mills at its Sabraton, W. Va., plant, and expects to start the other five mills in a week or two. A water pumping plant is being installed in this works to do away with the shortage of water, which caused the recent shutdown. We now quote full regular prices on Tin Plate, as follows: \$3.70 for 100 lb. Cokes, 14 x 20, f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days, this price being subject to the usual rebate of 5c. per base box in large lots.

Hoops and Bands.—Not many orders are being placed, but specifications against contracts are fair. Regular prices, which are reported as being maintained, are as follows: Steel Hoops, 1.80c., base, full Hoop card prices; Steel Bands, 1.40c., base, half Steel card extra, all f.o.b. cars, Pittsburgh, in carload lots, for delivery during 1908.

Iron and Steel Bars.—Specifications against contracts and new orders for Steel Bars entered by the mills in October were much heavier than in September, and are steadily increasing. The Republic Iron & Steel Company, one of the leading producers of Steel Bars, is operating to 75 per cent. or more of capacity. Other leading makers of Steel Bars report activity, and shipments are heavier at present than at any time this year. The railroads are increasing their car repair work, and the large orders for cars recently placed by Western roads will require a heavy tonnage of both Iron and Steel Bars. Orders for Iron Bars are fair, and the same is true of specifications against contracts, but none of the Bar Iron mills is able as yet to operate to normal capacity. We quote Iron Bars at 1.40c., base, for Pittsburgh delivery, and 1.35c., base, for Western points, to which freight is added, except Chicago, the price for which is 1.50c., delivered. We quote Steel Bars at 1.40c., Pittsburgh, for base sizes.

Railroad Spikes.—The Wabash and one other Western line have recently placed some fairly large orders for Railroad Spikes, and it is reported that some other roads will shortly come in the market. Practically all the Spikes being ordered now by the railroads will be used in repair work. The demand for the smaller sizes continues active, and the mills are well filled up. Prices are firm, and we quote: Standard sizes, $4\frac{1}{2}$ x 9-16 in., at \$1.70, and the smaller sizes at \$1.80 per 100 lb. in carload and larger lots, with an advance of 5c. per 100 lb. for less than carload, f.o.b. Pittsburgh.

Merchant Steel.—The past week has been quiet, but this is probably due to consumers holding off until after the election. Specifications against contracts are fair, and the outlook is regarded as fairly satisfactory. Some small orders are being entered for Shafting, but most large consumers placed their contracts some time ago, against which they are now specifying quite freely. Regular prices on Cold Rolled Shafting are 57 per cent. off in carloads and 52 per cent. on less than carloads, delivered in base territory. Prices on Merchant Steel are being shaded, regular quotations being as follows: Smooth Finished Machinery Steel, 1.80c. to 1.90c.; Flat Sleigh Shoe, 1.75c. to 1.85c.; Cutter Shoe Steel, 2.15c. to 2.25c.; Toe Calk, 1.90c. to 1.95c.; Railroad Spring

Steel, 1.60c. to 1.75c., the higher prices being for Pennsylvania Railroad analysis. Carriage Spring Steel is 1.80c.; Tire Steel, Iron finish, $1\frac{1}{2}$ x $\frac{1}{2}$ in. and heavier, 1.40c.; under $1\frac{1}{2}$ in., 1.55c. Planished Tire Steel is 1.60c., all f.o.b., at mill.

Spelter.—The market is decidedly firmer, some of the St. Louis smelters holding firmly at 4.70c., St. Louis, equal to 4.82 $\frac{1}{2}$ c., Pittsburgh. We quote prime grades of Western Spelter at 4.65c. to 4.70c., East St. Louis.

Merchant Pipe.—The Ritter-Conley Mfg. Company has taken a contract for fabricating 3000 tons of Steel Riveted Pipe of 9 ft. diameter and smaller for the Mexican Light & Power Company, Mexico City. Some small inquiries are in the market for Line Pipe and Casing, aggregating possibly 15 miles, but there are no large contracts in sight, it being too late in the season to start large jobs of outside work. The demand for Pipe is holding up remarkably well, new orders and shipments by the mills in October showing an increase over the previous month. The mills are firmly holding prices on both Iron and Steel Pipe, but occasionally jobbers shade prices to some extent. Discounts on Steel Pipe, $\frac{3}{4}$ to 6 in., to the large trade, are 76 and 5 per cent. off list. Regular discounts are as follows:

Merchant Pipe.	Jobbers, carloads, Steel.	
	Black.	Galv.
$\frac{1}{4}$ to $\frac{1}{2}$ in.....	67	51
$\frac{3}{8}$ in.....	69	55
$\frac{1}{2}$ in.....	71	59
$\frac{3}{4}$ to 6 in.....	75	65
7 to 12 in.....	72	57
Extra strong, plain ends:		
$\frac{1}{2}$ to $\frac{3}{4}$ in.....	60	48
$\frac{3}{8}$ to 4 in.....	67	55
$\frac{1}{2}$ to 8 in.....	63	51
Double extra strong, plain ends:		
$\frac{1}{2}$ to 8 in.....	56	45

Discounts on Genuine Iron Pipe are as follows:

	Black.	Galv.
$\frac{1}{4}$ to $\frac{1}{2}$ in.....	65	51
$\frac{3}{8}$ in.....	67	53
$\frac{1}{2}$ in.....	69	57
$\frac{3}{4}$ to 6 in.....	73	63
7 to 12 in.....	70	55
Extra strong, plain ends:		
$\frac{1}{2}$ to $\frac{3}{4}$ in.....	58	46
$\frac{3}{8}$ to 4 in.....	65	53
$\frac{1}{2}$ to 8 in.....	61	49
Double extra strong, plain ends:		
$\frac{1}{2}$ to 8 in.....	54	43

Boiler Tubes.—There is very little new buying in Merchant Tubes, and only a fair demand for Railroad Tubes for repair work. In fact, new orders for both Locomotive and Merchant Tubes for some months have been few and far between, and this has been the leanest year in this trade in a long time. Prices are shaded more or less and the market is generally unsatisfactory. For Merchant Tubes in small lots, on which an extra 5 per cent. is allowed in carloads, discounts are as follows:

Boiler Tubes.	Iron.	Steel.
1 to $1\frac{1}{2}$ in.....	42	47
$1\frac{3}{4}$ to $2\frac{1}{4}$ in.....	42	59
$2\frac{1}{2}$ in.....	47	61
$2\frac{3}{4}$ to 5 in.....	52	65
6 to 13 in.....	42	59
$2\frac{1}{2}$ in. and smaller, over 18 ft. long, 10 per cent. net extra.		
$2\frac{1}{2}$ in. and larger, over 22 ft. long, 10 per cent. net extra.		

Iron and Steel Scrap.—The Scrap trade is in rather peculiar condition at present. While large consumers are pretty well covered and the actual tonnage being sold is light, the market is firm and prices seem destined to go higher. Heavy purchases over the last month or six weeks by the Pittsburgh Steel Company and other large consumers have pretty well cleaned up the available supply of Heavy Steel Scrap, Borings, Turnings and other lines, and a good many dealers who have sold short are now compelled to cover on these sales. It is reported that small dealers have offered as high as \$16 on Heavy Steel Scrap to cover these short sales. The only items in the Scrap trade that seem to be lagging are Cast Scrap and Low Phosphorus Melting Scrap, the latter having recently declined sharply in price. Prices are very firm and dealers quote as follows, per gross ton: Heavy Steel Scrap for Pittsburgh, Follansbee, Monessen, Sharon and Steubenville, delivery, \$15.50 to \$15.75; Heavy Steel Scrap for hand charged Open Hearth furnaces, pieces weighing 10 lb. minimum to 300 lb. maximum, \$1 a ton higher; Cast Iron Borings, \$10 to \$10.25; Bundled Sheet Scrap, \$12.50 to \$12.75; No. 1 Busheling Scrap, \$14.25 to \$14.50; No. 2, \$10.75 to \$11; No. 1 Railroad Wrought Scrap, \$16.75 to \$17; No. 1 Cast Scrap, \$14.75 to \$15; Iron Axles, \$22.50 to \$23; Sheet Bar Crop Ends, \$19.50 to \$20; Low Phosphorus Melting Stock, guaranteed 0.04 and under in Phosphorus, \$18.25; Re-rolling Rails, \$17.50 to \$17.75; Steel Axles, \$19.50 to \$20; Grate Bars, \$12.50 to \$12.75; Old Car Wheels, \$16; Machine Shop Turnings, \$10.75 to \$11; Railroad Malleable Scrap, \$14.50 to \$14.75; Iron Rails, \$18 to \$18.50; Locomotive Tires, \$17 to \$17.25, all f.o.b. Pittsburgh. We note a sale of 500 tons of Heavy Steel Scrap to a consumer at about \$15.75, and

250 tons of Busheling Scrap at about \$13.90, f.o.b. Pittsburgh.

Coke.—Prices on both Furnace and Foundry Coke for prompt shipment are decidedly firmer and somewhat higher. A sale of a round tonnage of Standard Connellsville Furnace Coke for prompt shipment is reported at \$1.70 per net ton at oven, but there are some conditions attached to the sale which account for the high price obtained. We note, however, that prompt Furnace Coke is now held at \$1.65 to \$1.70 at oven, while on contracts for first half of next year Coke makers are quoting \$1.85 to \$1.90, and in some cases as high as \$2 at oven. Furnaces are deferring contracts, with the result that little tonnage has been sold for next year. We hear of one contract placed for about 15 cars a day, of strictly Connellsville Furnace Coke, for the first three months of next year, on the basis of \$1.85 at oven. Out of 37,630 ovens in the Upper and Lower Connellsville region 17,427 were active last week and 20,203 were idle. The output was 188,939 tons, a decrease over the previous week of nearly 10,000 tons.

The Keystone Iron & Steel Company, recently incorporated under the laws of Pennsylvania with a capital of \$25,000, has opened an office at 1301 Park Building, Pittsburgh, and will deal in Iron and Steel, Scrap and Mill Supplies. Ben Haas is manager.

San Francisco.

SAN FRANCISCO, October 28, 1908.

Some branches of the Iron and Steel business show a further improvement. While there are few large transactions to report, the outlook is for a gradual increase of activity for some time. The increased demand for Structural Material is the cause of the greatest encouragement, as many new building enterprises are now being carried out both in this city and elsewhere on the coast, and from the plans that are constantly being announced it is likely that there will be further improvement along this line. Steel Rails and Track Supplies for the small railroads in various parts of the State are beginning to move, and many new inquiries have recently been received. The demand for mining machinery, however, is still limited, and mining supplies in general are moving only in small quantities. While there is a large amount of development going on in the oil regions, the demand for supplies shows little improvement, though the movement of Merchant Pipe to the coast has increased somewhat over that of the last month or two. There is more marine repair work going on than for some time. Bids have been called for on some large lots of machinery and supplies for the Los Angeles aqueduct, but few awards have been made of late. The Pig Iron market remains uninteresting. Supplies of Scrap are large, with a limited demand. Considerable Old Pipe in merchantable lengths is being overhauled, coated with asphaltum and put on the market.

Structural Material.—The demand for Fabricated Steel for building purposes has increased very materially in the last month. Work is now actively under way on a large number of structures in San Francisco, and many very fair contracts have been let, while the work projected for the immediate future will call for larger quantities than have been moved for several months. The contracts in general are somewhat smaller than many of those that have been let in the past two years, owing to the fact that very few tall structures are being started. The present demand in the local building line is for store space, office accommodations being already sufficient for present needs. Nevertheless the class of work in general calls for Steel frame work, and many builders plan to add more stories later on. Work is also being started on a few buildings of fairly large size. Local prices for Structural Steel are very low, owing to keen competition among the local fabricators, and as a result less work than usual for San Francisco is being done in the East. Dyer Bros. have been awarded a contract for Steel work on a nine-story building on Post street, near Grant avenue, for \$35,000. A contract has been let for the Steel work on a four-story reinforced concrete building for Chas. Hughes. The Pacific Rolling Mill Company has recently taken a contract for the Steel work for the new Cliff House, for additional Steel construction for the Palace Hotel and the Phelan Building, and for a number of buildings outside of San Francisco, including the Hall of Justice at San Jose, Cal. Among the structures for which plans have recently been announced are an eight-story building on Post street, near Grant avenue; an eight-story building for the District Appellate Court and the Hastings College of Law, at the corner of Polk and Fulton streets, the estimated cost being \$450,000; a \$250,000 building for the London-Paris National Bank, at the corner of Sansome and Sutter streets, and a large four-story Steel frame building for the St. Francis Hospital, at Hyde and Bush streets. A contract has been awarded for the construction of two new buildings for the State Hospital at Agnew, Cal., for \$85,860. A proposition is under way for the erection of a hospital for

Alameda County, Cal., to cost at least \$300,000. The Baker Iron Works has taken a contract to erect the Structural work for a six-story building at Los Angeles for \$13,985. While the low prices for Steel work tend to lessen the demand for architectural Cast Iron, the foundries are doing more work in this line than for some time. The demand is mostly for ornamental Iron work, such as columns and bases.

Pig Iron.—Foundry business has not increased to any great extent, though there is now a fair amount of architectural work on hand, and there is slightly more demand for gas engine castings and general jobbing work. Some of the foundries are in a poor position, as is indicated by the recent sale of the comparatively new plant of the Mechanics' Foundry to the Enterprise Foundry Company for a price far below its original cost. Stocks of Pig Iron have decreased very little, and practically none is being moved at present. There is little Scotch Pig Iron on the market. Some Chinese Pig Iron is being brought in, but this is nearly all on contracts. Chinese Pig Iron is offered at about \$25. There are large offerings of a good grade of Continental Pig Iron, equivalent to No. 2 Alabama, at \$23, and large purchases could probably be made for less.

Cast Iron Pipe.—As far as actual business is concerned, Cast Iron Pipe remains in about the same position as earlier in the month, as there have been no transactions of any importance, and no tonnage worth mentioning has been moved for some time. A few large orders are in prospect, and with a number of smaller transactions which are likely to be closed in the near future the outlook is better. There is an inquiry for 3000 tons for the Los Angeles aqueduct, the bids on which will be opened next week. No bids have yet been called for on the local fire protection system, but it has been announced that about 40,000 tons will be required, and bids will probably be called for within the next 90 days. A proposition is on foot to establish an independent fire protection system in the town of Sonora, Cal. About 2000 ft. of Gas Pipe will soon be laid by the gas company at Santa Rosa, Cal. The Cudahy ranch, near Los Angeles, will soon be in the market for nearly \$15,000 worth of Pipe for a water system, from 16 in. to 6 in. The town of Yuba City, Cal., is preparing to install a complete new water system, with larger and heavier Pipe than is now in use.

Merchant Pipe.—The movement of Merchant Pipe from the East shows a considerable increase, the jobbers having been ordering more liberally. The tonnage, however, is not large. The jobbing business is about the same as before, with a good many small orders and considerable price cutting. The city of Los Angeles has ordered a fairly large lot of Merchant Pipe for use on the aqueduct. The usual discount is quoted on jobbers' carloads:

	Steel. Black.	Galv.
1/8 to 1/4 in.....	56.5	40.5
3/8 in.....	58.5	44.5
1/2 in.....	60.5	48.5
3/4 to 6 in.....	64.5	54.5
7 to 12 in.....	61.5	46.5
Extra strong, plain ends:		
1/4 to 3/8 in.....	49.5	37.5
1/2 to 4 in.....	56.5	44.5
4 1/2 to 8 in.....	52.5	40.5
Double extra strong, plain ends:		
1/2 to 8 in.....	45.5	34.5

Merchant Steel.—The jobbing demand for Merchant Steel in miscellaneous shapes shows considerable increase and deliveries are being made on numerous orders. No transactions of much magnitude are reported, but the volume of sales made by local houses appears to be gradually increasing. The city of Los Angeles is now in the market for a lot of Drill Steel for use on the aqueduct. The movement of Hoop Steel to the coast shows some increase, but the tonnage is small.

Rails and Railroad Supplies.—While there is a general inquiry for Steel Rails, especially Heavy Rails, and miscellaneous supplies, few transactions of any moment have been concluded recently, and buyers are apparently holding off until after the election.

Old Material.—Large quantities of Old Material are piled up in the local yards, and there is practically no movement. Prices are accordingly unsettled, and no definite quotations can be given on most varieties. Good heavy Cast Iron Scrap is offered at \$16, and large quantities could be had considerably cheaper.

The Balfour Spike & Mfg. Company has been incorporated at Tacoma, Wash., to manufacture a patent Railroad Spike. The capital stock is \$100,000, and the incorporators are J. W. Balfour, R. H. Buddy, Chas. Rickenbaugh, M. W. Dibble, and Frank Armstrong.

Mr. Abenheimer, Pacific Coast manager for the Arthur Koppel Company, has returned from a tour of the Pacific Northwest. He will leave in December for a vacation trip to Europe.

Word has been received here from Berlin, Germany, of the death of George E. Dow, head of the George E. Dow Pumping Engine Company of this city. This company has

under consideration a proposition to erect a large plant on its property in this city, at an expense of about \$600,000.

The United Steel Studding Company has been incorporated in San Francisco with a capital stock of \$50,000. The directors are F. H. Huddart, A. W. Nash, J. W. Richards and A. E. De Armond.

After a six weeks' successful run the experimental Lyon electric furnace, at Heroult, Cal., has shut down. It made 4600 lb. of Pig Iron in the last 24 hr. of operation. The furnace is considered quite satisfactory and a commercial furnace is expected to be ready for operation by January 1.

The Risdon Iron Works has taken a contract to build two fireboats for the city of San Francisco for \$262,200. Bids have also been called for on the pumping stations and machinery for the new fire protection system.

California railroad lines will publish the following rates on imported Iron and Steel products from Gulf ports to California terminals: Machinery and machines, carloads, per 100 lb., \$1.26; Iron or Steel plow beams, 76c.; plow points, shares, harrow disks, &c., 90c.; plows and extra parts for same, \$1.12; Wire Rope and Cable Iron, 99c.

The California Metal Trades Association is starting an active agitation looking to a number of changes in the freight rates on Boiler Plate, Structural Steel and ornamental Iron from points east of the Mississippi. The principal point at issue is the establishment of a differential between plain and fabricated structural material, and the wishes of the local association will be put forward at the next meeting of the Transcontinental Freight Bureau in Chicago. An active campaign is also going on to retain coast patronage for local shops.

St. Louis.

ST. LOUIS, November 2, 1908.

Building operations are promising. Holders of surplus funds are taking up with renewed vigor investments in various forms of productive real estate. The weekly returns covering this line of business show up well. New buildings to cost over \$1,000,000 were either announced or begun during the past week within the city limits. The near approach of the settlement of the political contest has been the occasion of the postponement of a number of large transactions in various lines until after the election. It has curtailed the action of the seller as well as that of the buyer, and in consequence reduced the volume and scope of offerings of staple commodities. It is current opinion that this waiting mood will be confined to the period referred to, it being merely the usual ante-election hesitancy.

Coke.—The leading sales agencies report quite an active demand for Coke, mainly for prompt shipment and coming principally from the smaller buyers. Larger consumers show more interest in the market and are making inquiries regarding price and shipment. For prompt shipment prices are firm at \$2.25 for standard brands of 72-hr. Foundry, at oven, Connellsville. For 1909 shipment \$2.50 is asked for first half. In some cases buyers are disposed to request shipment on contract to be anticipated and have increased their orders. Shipments are coming forward in a satisfactory manner. Furnace Coke is in good demand for shipment over balance of this year and first half of 1909. We quote \$1.65 to \$1.85, at oven, West Virginia.

Pig Iron.—The market for Pig Iron has been more active. With most of the sellers this demand has been mainly for prompt shipment. One house reports having an inquiry for 6000 tons of Southern No. 2 Foundry for shipment over 1909. Another company reports a sale of 2000 tons of Ohio strong Foundry for shipment over the first quarter of 1909. The actual business reported is coming principally from the smaller buyers. The large buyers seem disposed to hold off, having probably covered for their requirements for this year. Such interest as the large buyers manifest is directed to supplies of 1909 Iron. Business appears to be pretty closely confined to the first quarter, though we hear of some sales for the second quarter. For shipment over the last half none of the sales agencies is able to make offerings. A leading house reports an inquiry for 1000 tons of Malleable Bessemer, shipment of 500 tons to be made during the last two months of 1908 and 500 tons over the first quarter of 1909; also inquiries aggregating 2500 tons of No. 2 Foundry for the same shipment. Furnaces are reported as continuing to accept in some cases \$12.50, Birmingham, for No. 2 Foundry, for shipment over the balance of 1908. For special brands or sales of small lots for the same shipment we hear \$13 named. For first quarter 1909 all the leading sellers are firm, at \$13.

Finished Iron and Steel.—The leading interests report the demand for Structural Material confined mainly to fabricators, and with these companies the specifications are for comparatively small jobs about evenly divided between St. Louis and St. Louis territory. During the past week there has been a marked increase in the inquiry from this source. With the railroads gradually increasing their orders for all kinds of track material, Plates, Tank Steel, &c., jobbers are drawing on contracts and prices have stiffened. Bars

and Bar Products are finding a steady call, and Light Rails are in request from lumber and mining interests.

Old Material.—There is more demand for No. 1 Cast Scrap. In fact, the inquiry for foundry grades is now better than for the past six months, and a small advance in price has resulted. In the main, however, the character of the buying continues of a hand to mouth sort. A feature of importance is the fact that some quite large orders have been placed with the privilege of cancellation November 4. If the buyer is not heard from these orders are to be filled according to specifications; consequently there is liable to be a marked increase in activity the coming week. The demand for Relaying Rails continues quite good, with small stocks on the market. There are no railroad lots out. We quote dealers' prices per gross ton, f.o.b. St. Louis, as follows:

Old Iron Rails.....	\$16.50 to \$17.00
Old Steel Rails, rerolling.....	15.50 to 16.00
Old Steel Rails, less than 3 ft.....	14.25 to 14.75
Relaying Rails, standard sections, subject to inspection.....	23.00 to 24.00
Old Car Wheels.....	15.00 to 15.50
Heavy Melting Steel Scrap.....	13.50 to 14.00
Frogs, Switches and Guards, cut apart.....	13.50 to 14.00
Mixed Steel.....	10.25 to 10.75

The following quotations are per net ton:

Iron Fish Plates.....	\$15.00 to \$15.50
Iron Car Axles.....	18.50 to 19.00
No. 1 Railroad Wrought.....	13.50 to 14.00
No. 2 Railroad Wrought.....	12.50 to 13.00
Railway Springs.....	13.00 to 13.50
Locomotive Tires, smooth.....	13.00 to 13.50
No. 1 Dealers' Forge.....	11.50 to 12.00
Mixed Borings, &c.....	5.50 to 6.00
Machine Shop Turnings.....	8.00 to 8.50
No. 1 Rollers cut to Sheets and Rings.....	9.50 to 10.00
No. 1 Cast Scrap.....	12.50 to 13.00
Stove Plate and Light Cast Scrap.....	10.50 to 11.00
Railroad Malleable.....	11.00 to 11.50
Agricultural Malleable.....	10.00 to 10.50
Pipes and Flues.....	9.50 to 10.00

Lead, Spelter, &c.—The market for Lead is firmer and the demand is somewhat better. We quote 4.20c. to 4.30c., with special brands held higher. Lead Ore is dull and nominal at \$27 per 1000 lb., Joplin basis. Spelter is quite active and firm, at 4.80c. Zinc Ore is held at \$36 per ton, Joplin basis. There is some disposition to buy Spelter for forward shipment.

Philadelphia.

PHILADELPHIA, PA., November 3, 1908.

The market has a decidedly stronger tone throughout. Buyers in a number of instances were inclined to discount the election and placed orders covering requirements for the balance of the year, as well as the first quarter of 1909, while some buyers would have placed orders for still further deliveries, but in this they are discouraged by sellers, who are inclined to take orders, particularly for Pig Iron, for prompt delivery only. Inquiries have been more numerous in many lines, and buyers are testing the market and getting lines on prices, so that, should to-day's election prove favorable, they will be in a position to formulate their policies as to the future without delay. The railroad situation is no doubt improving, and some of the Eastern roads are now preparing to come into the market for cars, locomotives and Rails, as well as for maintenance of way betterments. The finished material market is probably not as buoyant as the Pig Iron market, Structural Material being the exception, as there is, no doubt, a large amount of business pending in this line. In the other classes of material, however, about a steady volume of business prevails, and while there is a considerable tonnage ahead in some lines, others are not so favorably situated.

Pig Iron.—There has been quite a buying movement. The individual orders have not been large, but the aggregate tonnage taken has been quite heavy. The bulk of the business was in the Foundry grades, although some fair lots of Forge, Basic and Low Phosphorus have been sold. Consumers are inclined to buy more freely, but in this sellers do not meet their views, and in a number of instances refuse to sell for delivery beyond the end of the current year; but some sales have been made extending over the first quarter of next year, although few in this territory are willing to contract for shipment beyond that period. Eastern Pennsylvania furnaces maintain a very firm attitude, and orders coming in are reported as somewhat larger than current production; in fact, the Empire Steel & Iron Company will blow in another stack the current week to meet the increasing demand. Several of the producers outside this immediate district, who have been underselling the market, are now understood to be maintaining current quotations, having booked all the low price tonnage they wanted. Sales during the week cover a somewhat wider range of tonnage than has recently been the case, the larger proportion of the business having been in lots ranging from 50 to 3000 tons, of both No. 2 X and No. 2 Plain Foundry, at full prices for delivery during the balance of the year; some larger lots, however, ranging up to 1000 and 1800 tons have also been closed, but these in the majority of cases extend over into next year's delivery. The Cast Iron Pipe Foundries are in

the market for 3000 to 10,000 ton lots, but sellers still refuse to meet their views regarding prices. Southern Foundry Iron has not been active, but prices are firmly held. Virginia Foundry Irons have been more active. Quite a fair buying movement has developed, principally from the West, orders from this territory and from New England being still rather small. One seller has disposed of over 4200 tons, about equally divided between No. 2 X and No. 2 Plain, at full prices, equal to \$17 and \$16.75, respectively, delivered, in this territory. An improvement in the demand for Forge Iron has also been noted, and several 1000-ton lots for delivery in the next two months and for the first quarter of next year have been sold at \$15.50, delivered. Some smaller lots have been done at \$15.75, delivered, while off grade Forge has been sold in small lots at about 50 cents under the market. The Steel makers are still inquiring for round lots of Basic for both prompt and forward delivery, but are slow in placing orders, the only sale coming out during the week being of 3000 tons of Virginia Basic for Western delivery during the first quarter, at a reported price equal to a shade better than \$16, delivered, in this territory. Further sales of Low Phosphorus Iron have been made recently, one seller disposing of an aggregate of 3000 tons, the greater portion of which was for Western delivery. Prices for this grade are somewhat firmer and quotations for delivery in this territory show a slightly higher range. A large volume of inquiries for all grades is before the trade, but sellers are not disposed to book large tonnages at the present range of prices, which are being firmly maintained. For delivery in buyers' yards, eastern Pennsylvania and nearby territory, the following range is quoted for deliveries during the remainder of the year, and in some instances extending into the first quarter of next year:

Eastern Pennsylvania, No. 2 X Foundry.....	\$16.75 to \$17.00
Eastern Pennsylvania, No. 2 Plain.....	16.25 to 16.50
Virginia, No. 2 X Foundry.....	17.00
Virginia, No. 2 Plain.....	16.75
Gray Forge.....	15.50 to 15.75
Basic.....	16.00
Low Phosphorus.....	20.00 to 20.50

Ferromanganese.—More inquiry has developed both for small tonnages for early shipment, as well as round lots for next year's delivery, but orders do not develop freely. Quotations still show a wide range. While \$43 to \$44, Baltimore, can be done in some instances, other sellers hold at \$45 to \$46, with the outside figure for deliveries in the first half of next year.

Plates.—Specifications are a trifle heavier, but new business comes out slowly. Some fair orders for bridge, boat and locomotive Plates have been booked, but nothing in the way of large tonnages have been closed. Considerable business is pending, and the trade is encouraged with the outlook for the future. Prices for delivery in this territory are being fully maintained and range as follows:

	Carloads.	Parts carload.
	Cents.	Cents.
Tank, Bridge and Boat Steel.....	1.75	1.80
Flange or Boiler Steel.....	1.85	1.95
Commercial Firebox.....	1.95	2.00
Marine.....	2.15	2.20
Locomotive Firebox Steel.....	2.25	2.30
The above are base prices for 1/4-in. and heavier. The following extras apply:		
3-16-in. thick.....	\$0.10	100 lb.
Nos. 7 and 8, B. W. G.....	.15	
No. 9, B. W. G.....	.25	
Plates over 100 to 110 in.....	.05	
Plates over 110 to 115 in.....	.10	
Plates over 115 to 120 in.....	.15	
Plates over 120 to 125 in.....	.25	
Plates over 125 to 130 in.....	.50	
Plates over 130 in.....	1.00	

Steel Billets.—There has been no improvement in the demand. Orders continue small, and are largely for prompt shipment, covering only the immediate demands of consumers. Ordinary Rolling Billets are quoted at \$26.20, and Forging Billets, \$28.20, for delivery in this territory, subject to the usual extras for high carbons and special sizes.

Structural Material.—A moderate volume of business, mostly for small tonnages, continues to be taken by local mills and fabricators, but a larger volume of business is under consideration. That some of this will come out shortly after the election is generally believed, the trade viewing the situation as far as the future is concerned quite optimistically. Prices are being well maintained, and for delivery in this territory range from 1.75c. to 1.90c., according to specification.

Sheets.—A somewhat more active demand has developed, and mills were again able to enter the week working full capacity. Orders, however, continue small individually, and, for the greater part, cover immediate needs only. Prices are unchanged, quotations for mill shipments ranging as follows, a tenth extra being added for small lots: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 to 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—While no particular increase in the demand for Refined Iron Bars is to be noted, the market shows increased strength. There is undoubtedly less shading of prices, and in some instances quotations have been advanced. The or-

ders coming out, however, are small individually and largely for early shipment. For delivery in this territory prices for Refined Iron Bars range from 1.45c. to 1.55c., dependent on grade and tonnage. Steel Bars are not active, but prices are firmly held at 1.55c., with Rerolled Bars quoted at 1.50c., delivered, in this vicinity.

Coke.—There has been some betterment in the demand for Furnace Coke, several buyers being in the market for next year's supply. Foundry Coke has not been so active, inquiries being largely for small lots for early delivery. Prices are unchanged but stronger. Foundry Coke for prompt shipment ranges from \$2.15 to \$2.25, at oven, and \$2.25 to \$2.40 for forward delivery. Prompt Furnace Coke is quoted at \$1.50 to \$1.65, at oven, for prompt shipment, and \$1.65 to \$1.90 for next year's delivery. For delivery in buyers' yards in this territory during the next 60 days, the following range of prices is named:

Connellsville Furnace Coke.....	\$3.65 to \$3.90
Foundry Coke.....	4.15 to 4.40
Mountain Furnace Coke.....	3.25 to 3.50
Foundry Coke.....	3.75 to 4.00

Old Material.—There has been a fair number of small sales of some grades during the week at prices somewhat above the low range recently quoted. Buyers are in the market for round tonnages in a number of instances, but sellers are inclined to confine their transactions to small spot lots. The market has a decidedly better tone throughout, and several grades show advances of from 25c. to 50c. a ton. In some grades which have been inactive quotations are nominally unchanged, but for prompt deliveries in buyers' yards, eastern Pennsylvania and nearby territory, the following range about represents the market:

No. 1 Steel Scrap and Crops.....	\$15.25 to \$15.75
Low Phosphorus.....	18.50 to 19.00
Old Steel Axles.....	21.50 to 22.00
Old Iron Axles.....	22.50 to 23.00
Old Iron Rails.....	19.75 to 20.25
Old Car Wheels.....	15.00 to 15.50
Choice No. 1 R. R. Wrought.....	18.75 to 19.25
Machinery Cast.....	15.25 to 15.75
Railroad Malleable.....	14.50 to 15.00
Wrought Iron Pipe.....	14.50 to 15.00
New Bundled Sheets.....	13.50 to 14.00
No. 1 Forge Fire Scrap.....	12.00 to 12.50
No. 2 Light Iron.....	9.00 to 9.50
Wrought Turnings.....	12.50 to 13.00
Stove Plate.....	13.00 to 13.50
Cast Borings.....	11.75 to 12.25
Grate Bars.....	13.50 to 14.00

W. H. Blakey, who for a number of years was connected with Plitt & Co., Iron and Steel merchants, has engaged in the same line of business under his own name, with office at 313 Hale Building, Juniper and Chestnut streets, Philadelphia.

Cincinnati.

CINCINNATI, OHIO, November 4, 1908.—(By Telegraph.)

The local market has gradually assumed increasing strength until all agencies are now engaged on important deals or options of some kind in Pig Iron, and factors in the finished Iron and Steel trade are alert to possibilities. The topic of conversation in Pig Iron circles Tuesday was the announcement of a prominent central Pipe maker that he would buy 27,000 tons of Iron to-day in the event of the Presidential election going to his liking. This covers six months' requirements. An Indiana manufacturer who wanted to speculate on a 10,000-ton lot of Southern Iron at a price of less than \$12.50, Birmingham, is understood to have been unsuccessful in his quest. The Scrap people are holding announced prices firm, with the expectation of doing an immense business.

Pig Iron.—About the only change to be noted in prices of Iron in this market for the balance of the year is the tendency of furnaces to firm up on existing quotations and to make \$13, Birmingham, for No. 2 the minimum on Southern and \$15 at furnace for No. 2 on Northern. It is freely predicted that the conditions of the past few months on Northern and Southern will be reversed and that the Southern product will be the drug if Southern Iron makers continue in their attitude of independence. All local agencies were busy with telegrams and long distance telephones yesterday, indicating a confidence in election results, and some good sized options were closed. A conservative opinion placed the amount of Iron sold through this market the past week at 75,000 tons and in the Central West at from 100,000 to 150,000 tons. Inquiries are not so numerous, but deals are being closed without the formality of letter inquiry. The declaration of the Pipe maker who will close for a half year's requirements is the most engaging. Then follow a Chicago manufacturer of Tacks who wants 3000 tons of Basic for next year and 2000 tons for this; a central Ohio manufacturer with an inquiry for 3000 tons of Foundry and Gray Forge, all Northern, for the first quarter; a northern Ohio manufacturer of agricultural implements who wants 1000 tons of No. 2 Soft, No. 2 Foundry and No. 3 Foundry for the first six months, and numerous foundrymen and manufacturers who will purchase in lots of 100 to 500

tons. Ohio Silveries are still quotable at \$18, at furnace. Not much is heard of low grades, but Southern Forge is probably obtainable at about \$11, Birmingham, for balance of the year. Many agencies which forecasted election results in special circular letters to the trade are now reaping returns. Some Southern furnaces are cautioning their sales representatives in the matter of next year quotations and seem disposed to be extremely conservative. For the balance of the year we quote, based on freight rates of \$3.25 from Birmingham, and \$1.20 from the Hanging Rock District, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$16.25 to \$16.75
Southern Coke, No. 2.....	15.75 to 16.25
Southern Coke, No. 3.....	15.25 to 15.75
Southern Coke, No. 4.....	15.00 to 15.50
Southern Coke, No. 1 Soft.....	16.25 to 16.75
Southern Coke, No. 2 Soft.....	15.75 to 16.25
Southern Coke, Gray Forge.....	14.25 to 14.75
Ohio Silvery, 8 per cent. Silicon.....	19.70
Lake Superior Coke, No. 1.....	16.45 to 16.95
Lake Superior Coke, No. 2.....	15.95 to 16.45
Lake Superior Coke, No. 3.....	15.45 to 15.95
Standard Southern Car Wheel.....	22.25 to 22.75
Lake Superior Car Wheel.....	21.75 to 22.25

(By Mail.)

Coke.—The market is remarkably quiet, and no change is to be noted in prices. There seems to be a disposition on the part of producers to contract a little further into next year, and it is quite certain that \$2.25 at oven may be done on shipments through the first half of Virginia grades (Foundry), and as for Furnace Coke, not enough inquiry is out to hazard an opinion. Consumption seems to be increasing a little, although some districts are at considerable expense for water because of the continued drought. Connellsville Furnace Coke is quotable at \$1.75, at oven for the first half; Virginia grades, \$1.85 to \$2.

Finished Iron and Steel.—The South and Southwest are still regarded as the most promising districts for early business, and some interesting contracts are being considered. The concrete building of the United States Printing Company, in Norwood, Ohio, is a late award, secured by the American Foundry & Machine Company, Pittsburgh. It will run \$60,000 or \$70,000. Among the early contracts which will use Structural Material is the extension planned to the water works plant at Newton Falls, Ohio, under the direction of the Reliance Engineering Company, Cincinnati. Bids are to be asked in a few days for about 6000 ft. of 4 and 6 in. Pipe; also pumping machinery, a couple of 50 hp. boilers, one high pressure fire service pump, one domestic service and one air compressor. A municipal building in Indiana which is expected to go through soon will involve the expenditure of between \$75,000 and \$100,000. Among the dealers prices are well maintained, with no product showing more than ordinary strength. Talk of advance in Bar Iron does not mature. Dealers are quoting to the trade, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.55c., base, with half extras; small lots from store, 1.85c., base, half extras; Steel Plates, carload lots, 1.75c., base, with half extras; small lots from store, 1.85c., base, half extras; Base Angles, carload lots, 1.85c., base; small lots from store, 2.10c.; Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.10c.; Plates, ¼-in. and heavier, carload lots, 1.85c.; small lots from store, 2c.; Blue Annealed Sheets, heavy, No. 16, carload lots, 2.15c.; small lots from store, 2.50c.; No. 14, carload lots, 2.05c.; small lots from store, 2.40c.; No. 10 and heavier, carload lots, 1.95c.; small lots from store, 2.20c.; No. 12, carload lots, 2c.; small lots from store, 2.30c.; Sheets (Light), Black, No. 28, carload lots, 2.65c.; Galvanized Sheets, No. 28, carload lots, 3.70c.; Steel Tire, 4-in. and heavier, carload lots, 1.95c.; Plates, 3-16 and No. 8, carload lots, 2c.; small lots from store, 2.20c.

Old Material.—Dealers have been simply waiting until election is over, when they confidently expect a big buying movement and are preparing accordingly. There is no change in prices, and absolutely no item of Scrap is exciting any kind of demand. Quotations, f.o.b. Cincinnati, are as follows:

No. 1 R. R. Wrought, net ton.....	\$12.50 to \$13.50
Cast Borings, net ton.....	5.00 to 5.50
Heavy Melting Steel Scrap, gross ton..	13.50 to 14.50
Steel Turnings, net ton.....	6.00 to 7.00
No. 1 Cast Scrap, net ton.....	12.00 to 13.00
Burnt Cast, net ton.....	9.00 to 10.00
Old Iron Axles, net ton.....	16.50 to 17.50
Old Iron Rails, gross ton.....	15.00 to 16.00
Old Steel Rails, short, gross ton.....	13.00 to 14.00
Old Steel Rails, long, gross ton.....	12.50 to 13.50
Relaying Rails, 56 lb and up, gross ton..	20.00 to 21.00
Old Car Wheels, gross ton.....	13.00 to 14.00
Low Phosphorus Scrap, gross ton.....	14.00 to 15.00

The Western Boat & Engine Company, New York, has incorporated to take over the plant formerly owned by Newbury & Dunham at the foot of West 210th street. The company's plant is completely equipped for the manufacture of motor launches, engines, &c. Frederick Floyd, who was for a number of years connected with Newbury & Dunham as superintendent, is general manager.

Birmingham.

BIRMINGHAM, ALA., November 2, 1908.

Pig Iron.—The recent efforts of leading melters to effect departures from the established schedule of prices on 1909 deliveries by offering cash for round tonnages have been wholly unsuccessful. Efforts to secure shaded quotations on significant tonnages for early delivery, subject to acceptance at a later date, were also without success, and the market is generally conceded to be stronger. Of the recent offerings at concessions from the basis being adhered to, 20,000 tons for delivery covering the first half is most significant. An offer of 3000 tons at lower figures than those quoted was made by a local melter, and 5000 tons for early shipment would have been placed by another concern at the figures desired. A cash offer of \$12.50 for 1200 tons to be delivered during the first quarter was refused, and an order for 5000 to 10,000 tons for delivery covering the entire first half is available at figures around such a basis. The actual sales recently reported aggregate but a small tonnage, ranging from carloads to lots of 300 tons. It is probable that limited quantities for prompt delivery are still available at lower figures than \$13, but no such figures were the consideration in any transactions among latest reports. A recent comparison of order books with the rate of production indicates that a significant proportion of tonnage booked for delivery during the present year is to be carried over into next year, which, taken with the sales so far effected for first quarter delivery, warrants the attitude of indifference by producers as to such commitments. The fact that the larger portion of first quarter commitments now on record is to be resold must, of course, be considered, but the limited extent of provision for anticipated requirements by all lines of foundry trades is likewise a consideration.

Cast Iron Pipe.—No contracts of significance have been placed with Southern producers since last report, but the aggregate of minor orders for maintenance work is fairly attractive. The demand for small sizes has predominated, and as a result the prices received are more satisfactory. It is stated upon good authority that orders now in hand for popular sizes are practically equal to the output of available producing capacity during the winter months, and an early advance in quotations is quite likely. The principal contract in sight at this time is to cover approximately 4000 tons of Water Pipe for the city of Nashville, Tenn. Bids will be received November 10. A number of orders for attractive tonnages are pending, and will no doubt be placed soon after the election. There has been a decided improvement in the inquiry for lots of 500 to 1000 tons. We quote the following on Water Pipe, per net ton, f.o.b. cars here: 4 to 6 in., \$24; 8 to 12 in., \$23; over 12-in., average \$22, with \$1 per ton extra for Gas Pipe. On large municipal contracts these quotations are probably shaded.

Old Material.—As is noted in other markets, more interest is manifested by all parties concerned, but actual transactions are not indicative of an improvement in conditions. The fact that consumers have in but few cases provided for their requirements to any extent is encouraging, and dealers continue to increase their stocks. We quote dealers' asking prices, as follows, per gross ton, f.o.b. cars here:

Old Iron Rails.....	\$14.50 to \$15.00
Old Iron Axles.....	15.50 to 16.00
Old Steel Axles.....	13.00 to 13.50
No. 1 Railroad Wrought.....	13.50 to 14.00
No. 2 Railroad Wrought.....	10.50 to 11.00
No. 1 Country Wrought.....	11.00 to 11.50
No. 2 Country Wrought.....	9.50 to 10.00
No. 1 Machinery.....	11.00 to 11.50
No. 1 Steel.....	9.50 to 10.00
Stove Plate and Light Cast.....	9.50 to 10.00
Cast Borings.....	5.00 to 5.50

Buffalo.

BUFFALO, N. Y., November 3, 1908.

Pig Iron.—A considerable increase in buying in Foundry grades has occurred during the week, and the total tonnage of sales is notably ahead of the preceding week. Foundries requiring Pig Iron for business in hand for finished product have evidently concluded that prices would not be materially less and might advance after election. There is, however, no inclination toward speculative buying on the part of consumers to provide for business not yet in hand; most of the inquiry being for deliveries beginning at once and running through the first quarter. Prices are firmer, although not quotably higher except for forward deliveries. We quote for current quarter and first quarter 1909, f.o.b. Buffalo:

No. 1 X Foundry.....	\$15.50 to \$16.00
No. 2 X Foundry.....	15.25 to 15.75
No. 2 Plain.....	14.75 to 15.25
No. 3 Foundry.....	14.50 to 15.00
Gray Forge.....	14.25 to 14.75
Basic.....	15.00
Malleable Bessemer.....	15.50 to 16.50
Charcoal.....	20.00 to 20.50

Old Material.—The market continues to be uneventful

and quiet, and although there is rather more inquiry from consumers, dealers are in most instances holding back, in anticipation of better prices being obtainable after election, and few sales are consummated. Prices remain firm, but unchanged, as follows, per gross ton, f.o.b. Buffalo:

Heavy Melting Steel Scrap.....	\$14.50 to \$15.00
No. 1 Railroad Wrought.....	15.00 to 15.50
No. 1 Railroad and Machinery Cast Scrap	14.00 to 14.50
Old Steel Axles.....	17.00 to 17.50
Old Iron Axles.....	20.00 to 20.50
Old Car Wheels.....	15.00 to 15.50
Railroad Malleable.....	13.00 to 13.50
Boiler Plate.....	12.00 to 12.50
Locomotive Grate Bars.....	11.50 to 12.00
Pipe	11.50 to 12.00
Wrought Iron and Soft Steel Turnings.....	8.00 to 8.25
Clean Cast Iron Borings.....	6.50 to 7.00
No. 1 Busheling Scrap.....	12.50 to 13.00

Finished Iron and Steel.—The volume of business in Bars and Plates and general lines, aside from material for railroad work, has kept up pretty well, and several good contracts have been placed both for domestic and Canadian consumption. One local bedstead manufacturing concern has placed an order for 500 tons of Angles with the Buffalo Steel Company and 500 tons of Bars with local jobbers. The Lackawanna Steel Company has commenced shipment on the order for 12,000 tons of Rails recently placed by the Northern Pacific. It is stated that that contract for the Structural Steel required for the Schenectady County court house at Schenectady, about 500 tons, will be awarded next week. That portion of the Canadian General Electric Company's requirements specifying acid Open Hearth Steel for the St. Andrews dam, about 2800 tons, was not included in the contract given last week to the United States Steel Products Export Company, and it will probably be placed abroad.

Cleveland.

CLEVELAND, OHIO, November 4, 1908.—(By Telegraph.)

Instead of showing some falling off, as had been expected, Ore shipments in October were larger than in any previous month this year. They aggregated 5,099,110 tons, or about 450,000 tons more than September. The total season's shipments down the lakes, to November 1, were 21,730,070 tons. The result of the election will stimulate the Ore movement somewhat during the balance of the season, and it is now expected that the total shipments will exceed 24,000,000 tons.

(By Mail.)

Iron Ore.—With the exception of one sale of about 10,000 tons of non-Bessemer Ore, the market has been quiet. There are a few inquiries pending that will result in the sale of a limited tonnage if the outcome of the election is regarded as satisfactory. The present activity in the Pig Iron market, it is thought, may also encourage some furnace interests to buy a little more Ore. It is so late in the season, however, that the Ore firms are not anxious to take on any more tonnage and are not seeking business. Ore shipments will now fall off rapidly. Few, if any, wild vessels will be loaded after this week, and the barges of the Steel Corporation fleet have been sent up the lakes for their last cargoes. As fast as they come down they will be placed in winter quarters. The merchant Ore firms that operate their own boats intend to keep them running as long as possible, as some of them will continue to bring down Ore until early in December. Prices at Lake Erie docks, per gross ton, are as follows: Old Range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; Old Range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—A heavy buying movement of Foundry Iron started last week, and is still in progress, the markets showing as much activity as at any time during the past two years. Sales of Foundry Iron by local interests exceed 40,000 tons. Of this over 25,000 tons was sold by local furnaces, the greater part of which was for delivery in this city and immediate territory. In addition to the heavy sales, inquiries are pending for about 50,000 tons of Foundry Iron, and it is expected that orders for a portion of this will have been placed by the time this is printed. The most important inquiry is from the Massillon Iron & Steel Company for 27,000 tons, 9000 tons each of Nos. 2, 3 and 4, deliveries to be equally distributed during the first six months of next year. Of the large number of sales that have been made few have been conditional on the result of the election. Consumers seem to have come to the conclusion that prices will go no lower, and that there is a possibility of an advance after election, and they are anxious to cover for at least a portion of their requirements for the first half. It is estimated that from 60 to 75 per cent. of the consumers of Foundry Iron in this territory have made purchases during the past week or have inquiries out. The majority of the sales were for the first quarter, some being for the balance of the year and first quarter, and others for the first half. Furnace interests, however, prefer not to sell at present for the entire first half. A number of 1000 ton lots were sold, few being of larger size, and many 300 and 500 ton lots were contracted for. A large share of the tonnage for the

first quarter was sold at \$14.50, for No. 2, at furnace. In a few cases for outside shipment it is understood that this price was shaded to meet competition having more favorable freight rates. For local and nearby delivery considerable brought \$14.75 to \$15, at furnace, for No. 2. As the result of the heavy buying the two local furnaces are pretty well filled up for the first quarter delivery, and one local furnace that has taken on considerable business at \$14.50 has advanced its price, and is holding firmly to \$15, at furnace, for No. 2 for outside shipments for the first half, and \$15.50, delivered Cleveland. Some tonnage has been sold at the advance in price. Sales at Toledo are reported during the week aggregating about 15,000 tons of Foundry Iron to western Ohio, Indiana and Michigan consumers, at \$15 to \$15.25, at furnace, for No. 2, for the first quarter and first half. In addition to the sales noted in this territory, a local interest, with furnaces in the Pittsburgh District and western New York, reports the sale of considerable Foundry Iron for the balance of the year. This interest, which has so far refused to sell Iron for delivery after January 1, is now ready to take orders for delivery after the first of the year, and is quoting a price of \$15 for No. 2. Reports from the Valley indicate that considerable Foundry Iron was sold there during the week, although one interest that has held firmly at \$15 for No. 2 made no sales. Nearly all the consumers that are buying are covering pretty fully for their expected requirements for the first quarter. The largest Foundry Iron inquiry now pending, aside from the one mentioned above, is for 4000 tons. In other grades of Iron the local market is rather quiet. We note the sale of two 1000 ton lots of Basic, and a local Steel plant has an inquiry out for 1000 tons. A local interest reports inquiries for Basic aggregating about 25,000 tons, but refused to quote until after election. A few sales of small lots of Malleable Iron were made, but the large consumers of Malleable have not yet come into the market. The activity in Northern Iron has aroused some interest in the Southern product, which has been practically kept out of this market for several months, owing to the difference in price. Among the inquiries for Southern is one for 1000 tons of No. 1 Soft. For the balance of the year we quote, delivered Cleveland, as follows:

Bessemer	\$15.40 to \$15.90
Northern Foundry, No. 1.....	15.65 to 16.00
Northern Foundry, No. 2.....	15.40 to 15.65
Northern Foundry, No. 3.....	15.00 to 15.40
Gray Forge	14.25 to 14.50
Southern Foundry, No. 2.....	16.85 to 17.35
Jackson County Silvery, 8 per cent. Silico.....	20.05

Coke.—The market is somewhat firmer, and there is an increased inquiry for Foundry Coke for the first half, some tonnage having been sold. We quote Standard Connellsville Furnace Coke at \$1.75, at oven, for the balance of the year, and about \$1.90 to \$2 for the first half. We quote 72-hr. Connellsville Foundry Coke at \$2.15 to \$2.25, at oven, for prompt delivery. For the first half as high as \$2.50 is being asked.

Finished Iron and Steel.—Buyers have been holding off as much as possible until after election. Specifications, while lighter than a month ago, are holding up fairly well. Consumers, however, are ordering in smaller quantities, and only for their immediate needs. As the end of the year is so near at hand, it is expected that this policy will be followed the next two months, manufacturers not wanting large stocks on hand at inventory time. A few contracts for both Iron and Steel Bars were closed during the week, the former coming from railroads for repair work. The largest single order on contract was for 500 tons of Plates and Shapes for a lake boat that is being built at Toledo. Boat builders are figuring on one or two new boats, contracts for which may soon be closed. Mills are getting some orders on contracts for carload lots, but nearly all the orders are for smaller tonnages. The demand for Structural Material is light, and not much improvement is expected this year. The demand for Plates from all consumers is light, practically all the business going to the smaller mills that continue to shade prices from \$1 to \$2 per ton. The price on Steel Bars is being firmly maintained, and there is little, if any, cutting in the price of Iron Bars. Rivet manufacturers report quite an improvement in the demand from railroads. Jobbers continue to do a fairly good warehouse business, and expect soon to place some good sized orders for stock. Jobbers' mill orders are light, but some inquiries are pending that will probably result in improvement. We quote Iron Bars, 1.45c., Cleveland, for car lots; Steel Bars, 1.50c., Cleveland, for car lots, half extras; Beams and Channels, 1.70c., Cleveland, and Plates, 1/4-in. and heavier, 1.70c., Cleveland. We quote Sheets, mill shipments, car lots, Cleveland, as follows: Blue Annealed, No. 10, 1.90c.; Box Annealed, No. 28, 2.60c.; Galvanized, No. 28, 3.65c. Jobbers quote Iron and Steel Bars out of stock at 1.65c. to 1.70c. Beams and Channels from warehouse are 2c., and Plates, 1/4-in. and heavier, 1.90c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.10c.; Box Annealed, No. 28, 2.70c.; Galvanized, No. 28, 3.80c. Warehouse prices on Boiler Tubes, 2 1/2 to 5 in., are 65 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 71 per cent. discount.

Old Material.—A better feeling prevails, and the market is very firm, although few inquiries are coming from consumers, sales being limited to small lots, for immediate needs. Dealers are still buying what Scrap they can, but are not able to pick up much at the prices they are willing to pay. Dealers' prices to the trade, per gross ton, f.o.b. Cleveland, which are unchanged, are as follows:

Old Steel Rails.....	\$14.00 to \$14.50
Old Iron Rails.....	17.00 to 17.50
Steel Car Axles.....	19.00 to 19.50
Old Car Wheels.....	14.50 to 15.00
Heavy Melting Steel.....	13.75 to 14.25
Relaying Rails, 50 lb. and over.....	22.00 to 23.00
Railroad Malleable.....	13.25 to 13.75
Agricultural Malleable.....	12.00 to 12.50
Light Bundled Sheet Scrap.....	9.50 to 10.00

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles.....	\$20.00 to \$20.50
Cast Borings.....	7.00 to 7.50
Iron and Steel Turnings and Drillings.....	8.00 to 8.50
Steel Axle Turnings.....	8.50 to 9.00
No. 1 Busheling.....	12.00 to 12.50
No. 1 Railroad Wrought.....	13.50 to 14.00
No. 1 Cast.....	12.00 to 13.00
Stove Plate.....	10.75 to 11.25
Bundled Tin Scrap.....	8.00 to 9.00

Metal Market.

NEW YORK, November 4, 1908.

Pig Tin.—An increase in the deliveries into consumption and a falling off in shipments from the Straits were responsible for much more favorable statistics than had generally been expected. According to compilation of C. Mayer, deliveries into consumption during October were 3000 tons. As the arrivals were only 2500 tons, stocks decreased 500 tons, making stocks in America now 1674 tons, as compared with 2159 tons at the end of September. The total visible supply decreased, and on October 31 was 17,524 tons. This is 500 tons less than last month, and is the first important decline in the visible supply in a year. The total American deliveries for the first 10 months of this year amount to 27,250 tons, compared with 32,250 tons in the same period last year. The publication of these statistics resulted in a sharp advance in prices in the London market, which was quickly reflected in this country. While some of the trade anticipated more favorable statistics, few, if any, believed they would be so marked as they were. A good business was done on Thursday and Friday of last week, which resulted in a fair advance then. Since these figures have been published the market has advanced further. The daily range of prices has been as follows:

October 28.....	29.40 to 29.50
October 29.....	29.45 to 29.55
October 30.....	30.00
November 2.....	30.25
November 4.....	30.37½

The London market closes firm to-day at £137 15s. for spot and £139 2s. 6d. for futures.

Copper.—Further advances in prices and more general inquiry have marked the course of this market. The large contract taken by the Westinghouse Companies for the Pennsylvania Railroad electrification, while an important piece of news in itself, was chiefly welcomed because it was believed to be the forerunner of many similar contracts. The decision to use the catenary construction was favorable to the Copper market, taking, as it does, an increased tonnage of this metal. European advices this morning were favorable, and prices in London were higher, closing at £62 1s. 3d. for spot, and £62 17s. 6d. for futures. The business transacted in London, in a speculative way, was large, amounting to 1200 tons of spot, and 1400 tons of futures. Prices in this country are higher, although the market is considerably unsettled. Lake is 14c. to 14.12½c., Electrolytic 13.75c. to 13.87½c., with very little offering at the inside price. The exports of Copper in September were 21,762 tons, making a total for the 10 months this year of 248,807 tons, compared with 157,064 tons in the same months last year.

Lead.—The demand has broadened, and while prices are unchanged from last week, there is a reluctance on the part of the cheapest seller, the American Smelting & Refining Company, to sell large lots or for more than six weeks in the future. Its price to-day for shipment Lead in 50-ton lots is 4.30c., New York; at the same time independent sellers are asking 4.30c., St. Louis, and 4.45c., New York.

Spelter.—The market is higher than last week. Inquiries have been much more numerous, but orders, at least such as are known, have not been large. The market for spot is 4.90c. to 4.95c., New York, and 4.80c., St. Louis. At least one seller is quoting on a basis of 4.90c., St. Louis, and 5.05c., New York, for December delivery. Nothing is offered for next year.

Antimony.—The market is very dull, and there is no change in price. Hallett's can be had at 8c., Cookson's at 8.25c., and outside brands at 7.75c. to 8c. The low prices of Antimonial Lead have adversely influenced the demand for Antimony, as most of its uses at this time are in composition with Lead.

Aluminum.—Foreign sellers are reported to be again looking into the possibilities of this market, but have as yet named no prices. The producer here is asking the unchanged price of 26c., for No. 1 ingots.

Nickel.—Prices are unchanged at 45c. for large lots and 50c. to 60c. for smaller quantities.

Tin Plate.—Business is dull, and some price cutting is reported. Quotations are \$3.89, New York, and \$3.70, Pittsburgh, for 100-lb. IC Coke Plates.

Old Metals.—All holders of Old Metals are unwilling to sell at these prices, believing higher ones will shortly prevail. Quotations have again advanced, and the following are dealers' selling prices:

Copper, Heavy and Crucible.....	13.25 to 13.50
Copper, Heavy and Wire.....	13.00 to 13.25
Copper, Light and Bottoms.....	12.00 to 12.25
Brass, Heavy.....	9.50 to 9.75
Brass, Light.....	7.25 to 7.50
Heavy Machine Composition.....	12.25 to 12.75
Clean Brass Turnings.....	8.25 to 8.50
Composition Turnings.....	9.50 to 10.00
Lead, Heavy.....	4.00
Lead, Tea.....	3.75
Zinc Scrap.....	3.50

New York.

NEW YORK, November 4, 1908.

Pig Iron.—A considerable number of sales have been made during the week, and this morning brings a flood of inquiries which indicate a deep interest. In some cases buyers state need of Iron for this year, but the bulk of the requirements are to cover at least a part of the first and second quarters. The market is firmer. We quote, at tidewater, \$17.50 to \$17.75 for No. 1 Northern Foundry; \$17 to \$17.50 for No. 2 Foundry, and \$16 to \$16.50 for No. 2 Plain. Alabama Irons are quoted, \$17.50 to \$17.75 for No. 1 Foundry, and \$17 to \$17.50 for No. 2 Foundry.

Steel Rails.—The Chesapeake & Ohio has placed an order for 2000 tons of Rails for immediate rolling at the South Chicago mill. The order for 12,000 tons for the Northern Pacific, reported in a press telegram, is really the placing of specifications with the Lackawanna Steel Company for the immediate rolling of that much of an old contract. One inquiry for 10,000 tons of Rails has come in this week, and the question of next year's requirements will be taken up soon by a number of roads. The Pennsylvania Railroad is expected to come into the market this month or next for a round tonnage, and the inevitable discussion of the price the Steel mills should have for complying with the exacting Pennsylvania specification will come up again. Track Supplies have been active of late. One order for 20,000 Angle Bars was booked by an eastern Pennsylvania mill.

Structural Material.—Locally, the largest contract of the past week is 5000 tons, for the Hoyt apartment building, which goes to the American Bridge Company. This company's bookings in October were about 20,000 tons, not including the Hoyt contract or the Chicago & Northwestern's 24,000 tons for Chicago terminals. The Cincinnati viaduct, 3550 tons, recently referred to, was taken by the Riter & Conley Company, Pittsburgh. Of pending work at Chicago, 30,000 tons will be required by four mercantile and office buildings, and a goodly number of such projects are about to be put forward in other parts of the country. In New York City mention is again made of the new municipal buildings, which will be placed next year. They call for about 15,000 tons. The Chesebrough addition to the Whitehall Building is also a live project. It will mean about 10,000 tons of Steel. In the past week, J. B. & J. M. Cornell, New York, have taken 2700 tons of Structural Steel, and Iron and Steel Castings for Contract No. 14, New York State Barge Canal. About 800 tons of Structural Steel is called for by three other Barge Canal contracts, for which bids will be opened November 17. The general contractors for the Stock Quotation Building, on Beaver street, New York, have placed the Steel, 800 tons, with the Eastern Steel Company. We continue to quote on tidewater deliveries, mill shipments as follows: Beams, Channels, Angles and Zees, 1.76c.; Tees, 1.81c. On Beams, 18 to 24 in., and Angles, over 6 in., the extra is 0.10c. Structural Material, cut to lengths, is sold in small lots at about 2¼c.

Ferroalloys.—Some Ferrosilicon has been sold cheaper than \$68, but it cannot be said that this is a true criterion of the market. Ferromanganese is steady at about \$43, Baltimore.

Bars.—The market has been rather quiet, although a few sellers are reported to have had some good Bar Iron business, with prices holding at 1.45c. to 1.50c., tidewater. Steel Bars are unchanged, at 1.56c., tidewater.

Plates.—The demand is limited to occasional small lots. Prices continue as follows, at tidewater, for Standard sized Plates: Sheared Plates, 1.76c. to 1.86c.; Flange Plates, 1.86c. to 1.96c.; Marine Plates, 2.16c. to 2.26c.; Firebox Plates, 2.65c. to 3.50c., according to specifications.

Cast Iron Pipe.—The city of Passaic, N. J., opened bids October 30 on 7 miles of 6 to 20 in. Water Pipe, aggregating

about 25,000 tons, but the general impression is that the contract will not be awarded for some time. The city of New York has received bids on 1400 tons of Pipe for the Coney Island high pressure service. The general demand is still light, with carload lots quoted at \$23.50 to \$24, tide-water, for 6-in.

Old Material.—Rolling mills are the best buyers in a generally dull market, taking small lots of Wrought Scrap, Rerolling Rails, Borings and Turnings. Steel makers are making some inquiry for Heavy Melting Steel Scrap, but are trying to get lower prices. Foundries are doing little. Prices are unchanged, quotations being as follows, New York and vicinity, per gross ton:

Old Girder and T Rails for melting.....	\$11.50 to \$12.00
Heavy Melting Steel Scrap.....	11.50 to 12.00
Old Steel Rails, rerolling lengths.....	14.00 to 14.50
Relaying Rails.....	22.50 to 23.00
Old Iron Rails.....	16.50 to 17.00
Standard Hammered Iron Car Axles.....	18.50 to 19.00
Old Steel Car Axles.....	15.50 to 16.00
No. 1 Railroad Wrought.....	15.00 to 16.00
Iron Track Scrap.....	12.00 to 13.00
No. 1 Yard Wrought, long.....	14.00 to 14.50
No. 1 Yard Wrought, short.....	12.50 to 13.50
Light Iron.....	7.00 to 7.50
Cast Borings.....	7.50 to 8.00
Wrought Turnings.....	8.50 to 9.00
Wrought Pipe.....	11.00 to 11.50
Old Car Wheels.....	14.00 to 14.50
No. 1 Heavy Cast, broken up.....	13.50 to 14.00
Stove Plate.....	11.50 to 12.00
Locomotive Grate Bars.....	11.50 to 12.00
Malleable Cast.....	12.50 to 13.00

Erie Canal Work.—The following material will be required for Erie Barge Canal construction, bids for which will be opened at Albany November 17 and 18: Contract No. 40—627,140 lb. Structural Steel, 5286 lb. Iron castings, 64,200 lb. Metal Bars for reinforcing concrete, 250,000 lb. metal for guard gates. No. 46—575,400 lb. Structural Steel, 26,800 lb. Steel Bars for reinforcing concrete, 12,800 lb. Steel Castings, 6600 lb. special machined Castings, 6000 lb. Wrought Iron Chain, 96,000 lb. metal for buffer beams, 25,000 lb. metal for lock valves, 188,000 lb. metal for lock gates, 25,000 lb. special machinery Castings. No. 47—158,000 lb. Structural Steel, 23,000 lb. Bars for reinforcing concrete, 1750 lb. Wrought Iron, 10,400 lb. Steel Castings, 6600 lb. machined Iron Castings, 24,000 lb. metal for lock valves, 90,000 lb. metal for buffer beams, 180,000 lb. metal for lock gates. No. 68—180,000 lb. Structural Steel, 61,000 lb. metal reinforcing for concrete, 26,000 lb. special machined Castings, 770,000 lb. metal for lock gates, 240,000 lb. metal for buffer beams, 100,000 lb. metal for lock valves.

Iron and Industrial Stocks.

NEW YORK, November 4, 1908.

The market showed alternate strength and weakness, but with no pronounced tendency in either direction until Monday when a vigorous buying movement set in which forced prices of some stocks up considerably. The range of prices on active stocks from Thursday of last week to Tuesday of this week was as follows: United States Steel common 47½ to 48½, preferred 110¾ to 111¾; Bethlehem Steel common 22, preferred 49 to 50¾; Car & Foundry common 41¾ to 42¾, preferred 103¾; Locomotive common 49¾ to 51½, preferred 106¼ to 106½; Steel Foundries new, 30½ to 31; Cambria Steel 35¾ to 36½; Colorado Fuel 35¾ to 37¾; Crucible Steel common 7¼ to 7½, preferred 48½ to 48¾; Pressed Steel common 33½ to 34¾, preferred 95 to 95½; Railway Spring common 39¾ to 41½, preferred 96½; Republic common 23¾ to 24½, preferred 81 to 81½; Sloss-Sheffield common 70 to 73¾, preferred 108; Cast Iron Pipe common 24¾ to 26, preferred 70 to 71; Can common 6¾ to 7¾, preferred 67½ to 69½. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 49¾, preferred 114¼, bonds 100¾, ex-interest; Car & Foundry common 44½, preferred 105¼; Locomotive common 53¾, preferred 108¾; Colorado Fuel 37½; Pressed Steel common 36¾, preferred 95, ex-dividend; Railway Spring common 43; Republic common 24¾, preferred 82½; Sloss-Sheffield common 74½; Cast Iron Pipe common 26¾, preferred 72; Can common 7½, preferred 70.

Dividends.—The Pressed Steel Car Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable November 25.

Enterprise Engines.—The Enterprise Mfg. Company, Columbiana, Ohio, which has heretofore been manufacturing its line of type S engines with throttling governor for saw mill and general purposes to which a portable and semiportable engine could be adapted, will hereafter in addition to making this engine, build it with an automatic governor, which has been found to be an approved type of drive for saw mills. It is also being extensively used for irrigating rice fields, many of them being suc-

cessfully applied to this service in Arkansas, on account of their economy over the throttling type. A new circular on this engine has been prepared for use of the trade. The company has also arranged for and will shortly place on the market a complete line of high speed automatic engines, intended for electrical service and where an efficient high speed engine is required, to be made in sizes from 25 to 250 hp., fitted for direct or belt drive, to be known as its type A. It is now completing one of these engines, 15 x 14 in., for direct connection to a 105 kw. Westinghouse alternating current generator, for installation in an electric light plant at Columbiana, Ohio.

Prof. J. O. Arnold, Sheffield, Eng., has reported on a new fusion welding process for uniting aluminum, copper, lead, tin, zinc and their alloys to and with iron and steel. He considers that the weld made by the process is a true molecular weld, and states that the welding operations have not deteriorated the quality of the steel. His microscopical examination of some of the welds showed an intermolecular absorption of the copper and steel, making the weld stronger than the steel itself. Licenses to employ the process in connection with rock drills and for tramway welds have already been issued, and it is stated that the British Government ordnance superintendent has made use of the process for putting caps upon shells and for gas rings in ordnance.

The stockholders of the National Steel Sheet Company, which was recently organized, and which has commenced the erection of a plant in Mansfield, Ohio, have elected the following directors and officers: William M. Blecker, president and treasurer; W. A. Neale, vice-president; George A. Lindoerfer, secretary and assistant treasurer; George Miller, superintendent. Directors: William M. Blecker of Canton, W. A. Neale of Pittsburgh, Elmer E. Mack of Canton, M. Green of Canton, George A. Lindoerfer of Cleveland, and George A. Miller of Canton.

The joint annual convention of the National Municipal League and American Civic Association, to be held in Pittsburgh November 16 to 19, will be addressed by President James J. Hill of the Great Northern Railroad on "The National Resources of the Country"; by President James McCrea of the Pennsylvania Railroad on "The Pennsylvania Railroad and the Smoke Nuisance," and by G. R. Taylor of the Illinois Central Railroad on "The Illinois Central Railroad and the Smoke Nuisance."

The Erie Railroad Company's report for the year ending June 30, 1908, states that 54.37 per cent. of the total operating expenses was paid by the company direct to labor, being distributed among 38,403 employees. The report adds: "The several State and Federal laws recently enacted, reducing the daily hours of service of certain classes of employees, have been made effective and have created a large additional expense without any corresponding return."

Williams, White & Co., Moline, Ill., manufacturers of bulldozers, heavy punching and shearing machinery, power hammers, drop hammers, &c., have opened an office in room 808 House Building, Pittsburgh, in charge of Frank Ryman, for some years connected with the Oliver Iron & Steel Company, Pittsburgh, and who has had many years of experience in the manufacture of forgings.

During the month of October 55,970 gross tons of 4 x 4 in. billets were rolled in the No. 1 blooming mill of the American Steel & Wire Company at the Newburgh works, Cleveland, Ohio. This is a new record for that mill, and is considered a remarkable tonnage for a mill of its kind.

The Lebanon Valley Iron Company has placed contracts for a new 16-in. mill for its plant at Lebanon, Pa. It will be the second addition to the plant in a year, a 12 and 8 in. combination mill having been added last summer.

The Machinery Trade.

NEW YORK, November 4, 1908.

Merchants generally the past week gave much attention to politics, and with the National election intervening the light demand for machinery was not surprising, especially in view of the tendency of the past few weeks to withhold specifications and orders, pending the outcome of the election. From reliable sources it is learned that business that would ordinarily have been placed, but has been held in abeyance, aggregates a large amount, and if only a good proportion is released considerable activity can be expected shortly in the machinery trade. Perhaps this year unusual precaution has been taken by the large buyers, especially the railroads which still adhere to their policy of retrenchment, but now that the election has been settled favorably, from the viewpoint of business men generally, it is expected that much of the business held up will be placed shortly. Of this large trade much is expected from the railroads, several of which are said to have substantial lists ready to submit for bids, or in course of preparation, and which, it is thought in the trade, they will now issue as soon as all details are completed. In addition to purchases of mechanical equipment, the railroads are preparing to spend large sums of money for new rolling stock and for repairs. Lately a considerable number of orders has been placed for steel cars, and manufacturers' plants are more active, as is shown by the intention of the American Car & Foundry Company to increase its capacity at St. Louis, Mo., where it is to construct a substantial addition. Locomotive builders have also shared in the increase of railroad buying, and being now practically assured of considerable of the new business being placed that has been held up are to increase their forces and output.

The activity among the car and locomotive builders will undoubtedly mean the purchase of large quantities of machine tool equipment by them within the next few months, and it will not be surprising to hear of the two leading interests becoming prominent factors in the machinery market. Of these the most prominent before the trade at the present time is the American Locomotive Company, New York, which has under consideration the purchase of machine tools aggregating in value \$275,000. It is understood that the list covering this large amount of machinery has been prepared, but has been held in abeyance. This equipment is to be installed in the various plants as business warrants. As the company's business is steadily increasing, it is thought that a good portion of the tools will be soon purchased, and while bids may not be asked at once on the whole list, specifications for substantial lots of tools are expected to be issued shortly. A few months ago the company purchased \$200,000 worth of machine tools for its Pittsburgh plant.

Westinghouse Gets the Pennsylvania Electrification.

Further activity on the part of the railroads is evidenced by the contract just placed by the Pennsylvania Railroad with the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., for the initial equipment, amounting to about \$5,000,000, for electrifying the New York terminals, including the stretch of track between Jersey City and Newark, N. J. In addition to the generating apparatus, the contract covers a large number of heavy electric locomotives, and it is said that it will take 20 months to install the system. It is roughly estimated that about 250,000 hp. will be used in the electric zone under the river and on land. The Westinghouse Company will begin at once to build the engines and the power producing machinery. The awarding of this large contract will mean much to trades involved in the manufacture and establishment of electrical apparatus, and will undoubtedly stimulate other companies to place contracts which have been held up. Manufacturers of power equipment not produced by the Westinghouse Electric & Mfg. Company will secure substantial orders for their equipment for the carrying out of the project. The more important is probably the boiler equipment that will be required for developing the power which will probably be generated at Harrison, N. J., where the railroad has for some time contemplated the construction of a large power plant. Freight and passenger terminals are also to be established at that point. In addition to the large contract just placed, other work of importance is to be undertaken which will not only require the purchase of electrical apparatus, but many other classes of machinery.

For some time the Grand Trunk Pacific Railroad, whose quarters are in Montreal, Canada, has been preparing plans for its new repair shops to be erected at Winnipeg, Man. This company is constructing an extensive railroad system and will need a large amount of mechanical equipment to

take care of its rolling stock. We understand that the entire plant, which will consist of a number of shops, will cost nearly \$1,000,000, and that plans have been completed for shops costing half of this sum. Contracts will shortly be placed for the first of the new shops, which will be 174 x 823 ft., of brick and steel construction. It is probable that as soon as the first building is under way contracts for other buildings to comprise the group will be awarded. The shops, which will be equipped with modern machinery for making repairs to the rolling stock, will be built about 2 miles from the city limits. Frank W. Morse is vice-president and general manager.

The new repair shop to be erected at Des Moines, Iowa, by the St. Paul & Des Moines Railroad will be 70 x 126 ft., with an L 40 x 42 ft., the probable cost of the construction being from \$10,000 to \$15,000. The company has most of the equipment that will be installed in the new building this season.

The new building, 60 x 230 ft., five stories high, being constructed by the Jamestown Metal Furniture Company, Jamestown, N. Y., is not an addition to the present plant, but is one of three buildings of equal size which are to comprise a new plant. While the machinery in the present plant will be moved to the new buildings and the company has already purchased a large amount of equipment for the new plant, some additional equipment will probably be required later which will cover principally power presses.

The Oil City Boiler Works, Oil City, Pa., is to largely increase the capacity of its plant by the erection of new buildings, which are expected to be completed by April. Owing to the large demand for its products the company some time ago decided that it would be necessary to enlarge the plant and acquired a site bounded by Duncan and Elm streets and the Erie Railroad, south of the original plant. The company has let contract for the construction of additional buildings on the recently acquired property, 180 x 355 ft., of brick and steel construction.

The Western Maryland Coal & Coke Company is planning to build a hydraulic electric plant to develop the water power of the Youghiogheny River in the vicinity of Friendsville, Md., and John L. Bogart, the well-known hydro-electric expert of 141 Broadway, New York, has been called in consultation on the plan. The company proposes to generate about 20,000 hp., which is to be transferred for coal mining, lighting and general manufacturing purposes. It is probable that some extensive dam construction will be included in the project, and that, together with the power material, will aggregate a large expenditure.

The Minnesota & Ontario Power Company, which was recently organized with offices in Minneapolis, Minn., has engaged of J. G. White & Co., 43 Exchange place, New York, as consulting and contracting engineers to complete the construction of a large dam and hydro-electric power plant at International Falls, Minn. This plant will be used to develop water power which will be utilized for running a ground wood sulphite and news print paper plant. J. G. White & Co. are now establishing a construction plant at a cost of about \$50,000, and this will be used for the construction of an immense dam and power plant which will aggregate from 20,000 to 25,000 hp. The company has established an operating office at Minneapolis, where the buying details will be arranged. The Minnesota & Ontario Power Company will purchase its own lumbering equipment and the machinery for its manufacturing plant. It is understood that the company has further manufacturing projects and will in the future be large buyers of general machinery equipment. It was recently organized with a capital stock of \$7,000,000, and the president, Edward W. Backus of the Backus-Brooks Company, Minneapolis, and a number of other capitalists prominent in the lumber and paper mill business are interested in the scheme.

The Ed. L. Fleehearty Company, San Antonio, Texas, is in the market for steam and gasoline engines, turbines, Pelton water wheels, special riveted and other pipe, brass tubing, hydraulic packing, belting, &c.

The Craig Water Power Company, Roanoke, Va., will develop two hydro-electric plants, one to furnish 800 hp. and the other 1800 hp. The company is to build an electric plant for lighting and power purposes in Roanoke. A. L. Sibert is president; Louis A. Scholz, vice-president, and Henry Scholz, secretary and treasurer. C. S. Wenges of Brownstown, Pa., hydraulic engineer, is preparing plans and specifications.

New England Machinery Market.

BOSTON, MASS., November 2, 1908.

October's totals exceeded those of September with most of the machinery dealers, and there is enough business in sight to make November a still better month. The immediate presence of the election has had a retarding influence the past few days, but in spite of this, some good orders have been placed. With election a thing of the past, the expectation is keen that the betterment of business will continue

with accelerating pace. Orders placed contingent upon the election will total large figures, it is said. The machine tool trade has not seen a great number of actual offers of such contracts, but a good deal of business which has been promised to be placed in case of a satisfactory political outcome, especially from the great railroad systems, should reach dealers and builders soon.

Another exceedingly important influence on the market should be the placing of orders to replenish stocks of raw materials and supplies. As has been often stated, hand to mouth buying by large and small consumers has caused stockrooms and storerooms to look like barren, wasted floor space. Those who have had occasion to go through industrial works and the stores of dealers in supplies and in commodities which enter into manufactured products, have been constantly impressed by the buying that would have to be done when business revived. A considerable percentage of manufacturers have accumulated some stocks of finished products, but on the other hand there are many establishments which have produced only in sufficient quantity to meet actual demand. The activity which should result from these conditions promises to become impressive.

Every line of the metal industry seems to be improving, some more rapidly than others. A few have already returned to normal conditions, while an occasional rare exception is rushed with business. The reports from manufacturers are unvarying, excepting in the matter of degree. The machinery builders always expect to be among the last to feel material improvement, but it is certain that they have started. Orders are being received in greater numbers, inquiry is active, and occasionally a sale of considerable size is booked. Manufacturers are chary of disclosing the names of customers, because in most cases they know that contracts for tools already placed are the forerunners of other business yet to come. Where machinery establishments have accumulated large stocks their confidence in the wisdom of their policy appears to them to be borne out by the promise of an active market, in which immediate deliveries will be important. It is not generally expected that the return of full productive capacity will come with a rush, nor is it hoped that such will be the case, the majority of manufacturers and dealers believing that a gradual, though not too slow, resumption of a full market will be the most wholesome influence.

Shop forces are being increased deliberately and carefully. In most works the best men have been retained, work having been given them whenever possible. In them the nucleus of a first rate organization is already established. Lessons learned in 1906, when any sort of a mechanic commanded the wages of high-grade journeymen, have not been forgotten. The apprentice systems have been fostered to as great an extent as possible under adverse conditions, and this will help. Second rate men are being hired at their true value. As for wages, there has been little decrease with good men. It has been only with those who had been receiving pay beyond their worth that a decrease has gone into effect. Manufacturers in metal lines are at an advantage in this element of cost with inferior help only.

A decided improvement in business conditions is noted in many of the manufacturing plants of Greenfield, Mass. The tap and die industry, which is the mainstay of the town, has not suffered proportionately with business generally, the plants have been fairly busy most of the time. Other concerns of the town have had a more prosperous 12 months than the average. Practically every industry of Greenfield is considerably busier than it was a few months ago.

In the Naugatuck Valley the machine builders who depend upon the brass manufacturers as important customers are beginning to feel the effects of the general improvement of the great industry of the section, and expect the influence to grow more pronounced in the near future.

The chair industry of Gardner, Mass., is rapidly recovering, the factories running at much nearer full capacity than at any time for a year. The condition is reflected in the machine shops of the town, which specialize on chair machinery; they report that the demand for this class of equipment has improved decidedly.

The Wachusett Machine Company, Fitchburg, Mass., is making inquiries on a long list of machine shop and foundry equipment, which, it is stated by the buyers, is for a new concern which will be located in South Carolina. Inquiries extend to second-hand as well as new tools. This list follows: Vertical boring machine, 72 in. diameter, 54 in. under rail; McCabe double spindle lathe, 20 in. 6 ft. between centers, with taper attachment, if possible; radial drill to work to centers of 8 ft.; universal milling machine, 20 in. by 7 in. by 18 in.; pipe machine, 2 in. by 8 in.; bolt machine, automatic attachment, to cut up to 2 in., for cutting, turning and heading bolts and tapering nuts; screw cutting engine lathe, 20 in. 10 ft. between centers, hollow spindle, turret attachment; screw cutting engine lathe, 10 in. swing, 5 ft. between centers; combination disk and surface grinder, with drill and ring grinder attachment; 2-ton floor scale; 1000-lb. floor scale; 1-ton platform scale for warehouse; 12-in. sensitive drill; 20-in. drill press; 28-in. drill press;

power bending rolls, 72 in. face; combination punch and shears, 36 in. throat, to punch $\frac{3}{4}$ -in. diameter through $\frac{3}{4}$ -in. plate; cold saw to cut 6 in. square or other shapes; power hammer to handle 6-in. forgings; two blacksmith forges for heavy work; 1500-lb. anvil; 1350-lb. anvil; boiler flue welder; two general service abrasive grinders; 30-hp. electric motor; 20-hp. motor; 12 track lifting jacks; two 10-ton hydraulic jacks; two 20-ton hydraulic jacks; 12 screw jacks, assorted sizes from 6 in. up; wheel press for 4 ft. diameter wheels, 100 tons pressure; air riveter; air drill; flexible shaft; portable keyseater; 5-ton traveling band crane, 25-ft. span; centering machine; hack saw; bulldozer; 2-ton cupola; blower for cupola; jib crane, air lift; tumbler; elevator; foundry ladles, $\frac{1}{2}$, 1 and 2 tons, and hand ladle; oil pump for emptying tanks; water grinder for heavy work; three steel tanks for oil, 5000 to 6000 gal. capacity; two tanks for oil, 500 gal. capacity; 300 to 500 ft. overhead trolley; sand blast for cleaning castings.

The Chandler & Farquhar Company, Boston, has purchased the complete machine equipment of the Boston Vibrator Company, comprising a miscellaneous assortment of tools, and the equipment of another plant, the name of which is not announced, including 17 milling machines, turret lathe, screw machines and general machinery.

Connecticut industrial stocks are showing a tendency to advance, especially of those concerns which manufacture metal goods and machinery. Changes noted are the advance of American Brass Company from \$105 to \$106; Colt's Patent Fire Arms Mfg. Company, Hartford, from \$79 to \$80; Eagle Lock Company, Terryville, from \$70 to \$72 (par value \$25); Pratt & Whitney Company, Hartford, preferred, from \$97 to \$97 $\frac{1}{2}$, and Whitlock Coil Pipe Company, Hartford, from \$105 to \$110. A few slight decreases in quoted values are noted in textile stocks, but none in metal lines.

The United States Envelope Company announces as a result of a recent meeting that it will erect the large plant at Springfield, Mass., mention of which was made some months ago. A tract of land containing some 88,000 sq. ft., on the Boston & Albany Railroad, was acquired last year. In a general way the plans call for buildings to contain between 350,000 and 400,000 sq. ft. of floor space. It is understood they will be of brick, mill construction.

The Henry Paper Company is building a large addition to its mills at Lincoln, N. H.

The Kwalty Tool Company, New Haven, Conn., has been incorporated in Connecticut with capital stock of \$5000. The incorporators are George P. Butler, Nettie B. Butler and Daisy N. Church.

Chicago Machinery Market.

CHICAGO, ILL., November 2, 1908.

Trade in machinery lines for the month of October has been by no means uniform; orders were fairly plentiful, for the times, at the beginning of the month, and held about even for the first two weeks, but there has been a noticeable falling off since that time. It is a generally expressed belief that this halt is directly due to a desire on the part of buyers to defer action until after election. There is, indeed, no other reasonable cause to be assigned since the general trend of developments in financial and industrial matters has in the meantime been steadily toward improvement, which in some directions is more pronounced than in others. If it is true, therefore, that a considerable volume of business is being held back until the results and the balloting on November 3 is known, there ought, under favorable conditions, to be a decidedly better movement immediately after that event. At the same time no phenomenal rush of orders is looked for, nor, indeed, desired, by the best informed trade interests, since it is felt that a sudden spurt of this nature would certainly result in reaction of corresponding force. What is desired is a steady, conservative, but positive, growth of demand that will within reasonable time bring the machinery trade back to a volume of normal average, and there is widespread confidence in the retainment of this result not many months hence.

Although the railroads have become more active in the purchase of supplies, the restriction against the renewal of tool equipment, further than is absolutely necessary, still holds. Both the Santa Fé and the Rock Island have recently been in the market with a few scattering orders, which, however, included nothing of noteworthy interest. The contract car repair shops have been working pretty full handed of late and have been forced to buy a few new tools to expedite work. The machine tool business is, in fact, made up of the indispensable wants of various industries, and there are but few enterprises actually under way calling for new equipment of any considerable size. Bids are being submitted by dealers on a few machines required for Swift & Co.'s car shops. These include a heavy hydraulic wheel press, a wheel boring machine and heavy axle lathe.

The remarkable expansion in demand for automobiles has continued to grow during the past year in face of general industrial depression. Manufacturers of these machines have enjoyed a fairly prosperous business throughout the year, and some have even found it necessary to increase their productive capacity. With this end in view McCord & Co., Chicago, makers of automobile radiators and lubricators, are preparing to remove their plant for the manufacture of these goods to Detroit, Mich. They will occupy a part of the plant of the Hugh Wallace Company, on the south side of North Grand boulevard east, between Riopelle and Orleans streets. Preliminary to this step the company established a temporary branch plant for the manufacture of automobile radiators a few months ago in a part of the plant of the Penberthy Company. This branch will now be consolidated with the manufacture of other accessories in the new factory, which is 50 x 258 ft., two stories. Present plans contemplate the erection, a little later, of a brass and aluminum foundry. The machinery equipment for the Detroit plant will be supplied in large part from the present Chicago works, although some new tools and machinery will be needed. Motive power will be supplied by electric current from outside sources, which will be distributed through group motor drives. Motors for this purpose will be purchased. McCord & Co. also manufacture railroad supplies, and this department will continue its headquarters in Chicago, as heretofore.

The Gunnell Machine Company, Manitowoc, Wis., manufacturer of steel working tools and appliances, has increased its capital stock from \$35,000 to \$50,000, the purpose being to enlarge the plant and to equip it with new tools and appliances suitable for all kinds of marine construction and repair work.

We are advised by B. F. Thum, clerk of the Village Board, Safford, Ariz., that an electric light plant will be constructed at that place by private interests, work upon which is expected to begin in November.

The Willow Springs Electric Light & Water Plant, Willow Springs, Mo., has been purchased by J. Sam Brown, Nevada, Mo. Some necessary repairs are now being made, but it is probable that the whole system will be reconstructed in the spring.

The Franklin Mining Company, Highland, Wis., incorporated with a capital stock of \$100,000, has just erected four shaft houses on zinc ore mines in the Highland District, and expects to install a power plant in the near future. H. Lewis is superintendent.

McDowell, Stocker & Co., Chicago, note a recent falling off in orders following a fairly good business for the first two weeks of the month. Among the heavier tools included in recent sales were four of the largest size Becker-Brainard milling machines. This company is also Chicago agent for the Racine hack saw.

Cleveland Machinery Market.

CLEVELAND, OHIO, November 2, 1908.

Business with the local machine tool dealers is quieter than for several weeks, the more noticeable inactivity being attributed to the election being close at hand and buyers holding off until the political contest should be decided. Outside of single tools, two or three fairly good orders were placed, but these had been pending for several weeks. Few inquiries came in. Taking October as a whole, dealers report that the volume of their business was not quite so large as during September. The falling off in October is due largely to the fact that the automobile people, who were heavy buyers in September, bought very little machinery equipment in October. Although the volume was less, the total number of October sales made by some of the machinery houses was larger than in the previous month, the absence of good sized orders cutting down the volume. While machinery houses are looking for an improvement in orders in November, should the result of the election be regarded as favorable, the end of the year is so near at hand that they do not expect much betterment before January. Under normal conditions machinery dealers usually regard December as a poor month for them.

With the tool manufacturers orders and inquiries are light, the effect of the political campaign being as noticeable on their business as on that of the dealers. Some orders have been placed conditional on the result of the election.

In second-hand machinery the market is quiet, the demand being less active than in the past few weeks.

Jobbing foundries report no improvement in the volume of their business. Orders for castings are still mostly for small lots for immediate needs. In a majority of manufacturing lines outside of machinery, business continues to grow slowly, and the outlook for further improvement is favorable.

At the fall meeting and luncheon of the Cleveland Branch of the National Metal Trades Association, held October 29, business conditions were discussed by many of the leading

manufacturers of the city who were present, and the general feeling regarding the future outlook was quite optimistic. Nearly all the speakers reported that business had already shown considerable improvement, and they look for greater activity after election. Some of the expressions of the firms represented were as follows:

National Screw & Tack Company: "Our business for the last two months shows a satisfactory increase. The reports from the agricultural districts show that they are placing their orders for the usual amounts. The feeling among a number of manufacturers in our line of business is that if election goes right there need be no fear about business. Our company feels the same way."

Cleveland Hardware Company: "We do considerable business with the farmers. They have all contracted this year as they always have done. Business spurted a little last month, and we believe that it is now simply hanging fire until after election. Out West they do not seem to realize that there was a panic. Our traveling men tell us that business is all right in those sections. In St. Joseph, Mo., several business men came together a few days ago from different cities, and not one reported other than that jobbing business was fairly good in those sections. Collections are normal."

C. O. Bartlett & Snow Company, crushing, elevating and conveying machinery: "Our company has done from 85 to 95 per cent. of the business done last year. A little over 25 per cent. of this business was foreign trade. Prospects are very good for the future."

Avery Stamping Company: "In regard to business we are well pleased with the volume in some of our lines. The future looks good."

Bruce-Meriam-Abbott Company, gas engine builder: "We have closed more business in the last 15 days than we did in the 10 months previously. We have many inquiries, and the outlook in our line is very good."

Pearless Motor Car Company: "We have as many orders on our books as on March 15 last year. We have about 950 employees at work, and this month we have shipped more cars than ever before in any one month, and this is not the season for our product."

Ferro Machine & Foundry Company: "The outlook for next year is very good. We deal largely with the automobile trade. We also build a large line of marine engines that we ship all over the country. We are working night and day in our machine department. The trade seems to order in small quantities, contracting for the season's requirements, but not in any specific amount. Our correspondence with 1000 agents shows that business is getting better. We do quite an extensive foreign business, which is better than last year."

John S. Oram, barrel machinery: "Orders are improving and the outlook is very much better."

Johnson & Jennings Company: "We are on the eve of a wonderful development in manufacturing and commercial industry. The hard times are back of us, things are picking up and the good times are in front."

Allyne Brass Foundry Company: "Business has been fairly good. We expect it to be very good next year."

The Davis Steam Generator Company, Toledo, Ohio, has been incorporated with a capitalization of \$100,000, by Samuel S. Davis, Walker Morrison, L. J. Pugh, A. H. Razor and John M. Ormond, to manufacture a new steam boiler, the invention of S. S. Davis. The company will soon select a site for a plant.

The Firestone Tire & Rubber Company, Akron, Ohio, has purchased the plant of the Globe Foundry & Machine Company, adjoining the Firestone Company's present plant, and announces that it will use the site for a large new factory building, erection of which will be started in the spring.

The Cleveland Railway Supply Company has been incorporated with a capitalization of \$30,000, to deal in railroad supplies, by W. S. Newhall, who has been engaged in that business, and others. The company has offices in the Citizens' Building.

The H. F. Patton Mfg. Company, Cleveland, has been incorporated with a capitalization of \$50,000, by H. F. Patton, B. L. Laird, J. E. McGilvrey, L. S. Lafferty and May H. Prentice. The company will make a specialty of the manufacture of stereopticons and other lecture equipment.

The contract for the steel work for the main building of the sheet mills to be erected by A. B. Clark and others of Canton has been awarded to the Massillon-Toledo Bridge Company, according to reports from Canton. Although it was announced that the plant would be built in Massillon, it is possible that a site will be selected in some other city.

The Doe Battery & Mfg. Company, Kent, Ohio, has been formed to manufacture batteries and specialties, and is fitting up a plant. Walter S. Doe is general manager of the company and F. D. Pitkin is secretary and treasurer.

The Home Specialty Company, Lorain, Ohio, has been organized to manufacture galvanized iron mail boxes for private houses. The company is building a plant at 419 Kent street in that city.

The Standard Pattern Works, 5333 St. Clair avenue,

Cleveland, which has been operated as a partnership, has been incorporated under the name of the Standard Pattern Works Company, with a capitalization of \$10,000.

Cincinnati Machinery Market.

CINCINNATI, OHIO, November 2, 1908.

Enough matters of outside interest have enlisted the attention of heads of large tool and general machinery manufacturing concerns in this district during the week and month past to disturb seriously the even tenor of office routine, and now, on the very eve of election, awaiting the returns, it is only to be expected that some would assert, "We are all at sea; we do not really know; we feel that there is to be a big business revival very soon—when this election excitement is over. Our correspondence leads us to expect this." The largest shops the past week have been converted during the noon hour into temporary lecture interiors, and speakers of more or less eloquence have harangued the workmen along political lines.

Office forces report an increasingly optimistic tone to correspondence, and the belief is current that some good sized orders for equipment for railroad shops, agricultural implement factories and miscellaneous manufacturing concerns, held up for weeks and months, will be released as soon as election results are known and construed as favorable. The opportunity given our large tool manufacturers, members of the National Machine Tool Builders' Association and of the National Metal Trades Association, to confer with the officials of the latter, who have been in session here—the semiannual gathering—to arrange for details of the annual meeting to be held in New York City late in March, and hear reports from officials and committees, was an incident of the week and was largely embraced.

Inquiry of tool manufacturers as to conditions of October's closing indicate that in the main it was light and scarcely up to expectations as produced by developments during the month, or, in other words, what they were led to expect from tone of correspondence and actual orders during the early and middle month. On the other hand, the large dealers have had a very good month. One concern reports results of its machine tool department being the best month's income since September, 1907, sales having been of standard tools mainly. One sale of the month was at a dealer's and included specifications for nine machines, and this same concern has a number of specifications for shop equipment dependent on the results of election.

Second-hand tools are a drug, and dealers are making special prices to move any accumulation they may have. Dealers in this territory are generally well stocked on all types of standard tools and machinery, and prepared for any unusual buying movement.

Engineering concerns are very busy with drawings and specifications for large buildings and additions to existing plants, such structures as are not located in or very near Cincinnati being mainly in the South. Some nice lists for equipment are in the hands of promoters of these enterprises, but mainly dependent on election results.

The foundry industry has been at a standstill for several weeks; save those institutions which make a specialty of miscellaneous small castings for standard labor saving and modern office devices. Some foundrymen have bought iron in the past week or ten days, but in small lots mainly, anticipating a general increase in the price of iron if the election results favorably.

Reports from firms and concerns which do business with the agricultural implement manufacturers indicate that these last have been and are busy; some of them not noticing the effects of the depression. This last was forcibly brought out at the annual meeting last week in Columbus of the National Association of Agricultural Implement and Vehicle Manufacturers, which was largely attended. Among other things accomplished in session, a resolution indorsed the bill now in Congress for the creation of a court of patent appeals, but disapproved the extension of the terms under which patents are now granted. The association also declared for the passage by State legislatures of effective peddlers' licenses; opposed the parcel post as being inimical to the interests of retail dealers; asked that the laws of the several States in relation to interstate commerce be made uniform; pledged the members to mutual efforts toward shortening of terms of credit; indorsed the appointment of R. R. Dennis as special agent of the Department of Commerce, and favored the appointment of additional agents in the work being done with reference to foreign implement manufacturing.

Judge Hanna of the Indiana Superior Court, Indianapolis, has approved the sale of the Insley Iron Works by the receiver, William H. Insley, to Jacquelin S. Holliday, for \$6150.

Reports from pig iron sales agencies indicate that the manufacturers of plows, cultivators and other farm implements in the Central West have been gradually increasing

time and forces, and some of them are now working night and day, notably the Oliver Works, at South Bend, Ind., where employees have been put on extra time and night shifts inaugurated.

According to plans prepared by the Owens Bottle Machine Company, Toledo, Ohio, an addition to its plant is an early possibility.

Chief Electrician W. A. Hopkins of the Wabash Railroad is completing the installation of electric motors in the shops at Fort Wayne, Ind. Except the use of steam for the operation of the air compressor, and for heating, all machinery in the Fort Wayne shops will henceforth be motor driven. The work has been completed at the Moberly, Mo., shops of the company.

Reports for the quarter at the last meeting of the Columbus Chain Company, Columbus, Ohio, showed the best quarter's business of the year, and particularly the month of October. At this meeting the regular quarterly dividend of 1½ per cent. on the preferred stock was declared, as also the usual dividend on the common. The company's plant has been given a complete overhauling, and is excellently equipped for the expected improvement in business.

Among the Ohio inventors securing patents on articles through H. E. Dunlap, patent lawyer of Wheeling, W. Va., B. M. H. Lange, assignor to the Toledo Machine & Tool Company, is given papers for a friction clutch; to W. H. Rabbe, E. W. Hardeu and M. E. Dempsey, Hamilton, Ohio, for a railroad frog; to J. N. Vail, Bryan, Ohio, a rail clamp.

The National Metal Trades Meeting.

Executive councillors of the National Metal Trades Association concluded on Friday in this city an interesting mid-year meeting. First Vice-President H. P. Eells, Bucyrus Company, South Milwaukee, Wis., was absent, in Europe, and Councillor George Mesta, Mesta Machine Company, Pittsburgh, was detained by business, otherwise the full council was present. President F. K. Copeland, Sullivan Machinery Company, Chicago, presided, and others present were: Treasurer William Lodge, Lodge & Shipley Machine Tool Company, Cincinnati; Second Vice-President J. H. Schwacke, William Sellers & Co., Inc., Philadelphia; Councillors: John R. Black, F. E. Reed Company, Worcester, Mass.; R. B. Kendig, Seneca Falls Mfg. Company, Seneca Falls, N. Y.; C. Bermingham, Canadian Locomotive Company, Ltd., Kingston, Ont.; M. K. Bowman, Griscom-Spencer Company, New York City; H. W. Hoyt, Great Lakes Engineering Works, Detroit, Mich.; E. P. Robinson, Atlantic Works, East Boston, Mass.; W. A. Layman, Wagner Electric Company, St. Louis, Mo.; honorary member, M. H. Barker, American Tool & Machine Company, Boston, and Commissioner Robert Wuest and Secretary N. W. Dingwall of the Cincinnati offices of the association.

Reports submitted at the meeting show an increase in the assets of the association, which while not representing a great sum, is in the estimation of the officials, and recalling trade conditions, very pleasing. The total membership of the association is now 726. It was determined also, in view of the few resignations or changes during the year, that the membership is entitled to special congratulation, and it was accepted by the officials as evidence of belief of the association's value to the manufacturing industry at large. From reports at the meeting it was shown that business improvement has made the greatest development in the East, 68 per cent. of the operatives being now employed, as shown by payrolls.

The next meeting of the association will be held at the Astor Hotel, New York, late in March, the exact date to be determined in the meantime.

Philadelphia Machinery Market.

PHILADELPHIA, PA., November 2, 1908.

The volume of business transacted during October in the local machinery market can hardly be termed satisfactory. Nearly all lines, excepting probably certain classes of special equipment, will show a falling off when compared with September. This condition was not unexpected, as, in view of the Presidential campaign, a large volume of business was temporarily held in abeyance. Inquiries, however, have been numerous, many developing from buyers who will no doubt be prepared to enter the market shortly after election or early in the coming year. The trade, therefore, has been looking forward and basing its opinions on what business was expected to develop in the near future, rather than on that done during the month. In this they have been encouraged by the improved condition of the railroads, which, in the West, particularly, have placed some good orders for rolling stock, motive power and maintenance of way betterments. Several of the Eastern roads now show a disposition to come into the market in the same way, and while this business does not directly benefit the trade, its indirect in-

fluence strengthens the situation quite materially. It is also known that some of the roads are quietly looking over their approximate future needs in the way of machine tools, not with the view of immediate purchases, but in order that they may be prepared for any emergency, which should develop from more active conditions.

Manufacturers generally report unchanged conditions. There has been a fair run of single tool business in the medium and smaller lines of tools, with some good inquiry, and an occasional order for equipment of the heavier type coming largely from the Government or from the iron and steel industries. No particular improvement is to be noted in the operation of the larger plants. Some of the smaller ones, however, as well as some builders of special tools report a slight increase in orders and output during the month just closed. Sales have not shown any particular increase during the month, the business transacted being irregular. Purchases are frequently made without a great deal of shopping around, which would make it appear—inasmuch as it has been generally the custom to spread inquiries rather broadcast—that the volume of business before the trade was not so great as it was some time ago. Transactions continue almost entirely of the single tool variety, and it is seldom that orders covering any number of tools have been taken.

There has been no improvement in the demand for tools for export, particularly those of the standard types. Special tools have been in a shade better demand, but on the whole this branch of the trade has been rather quiet. Manufacturers transacting an established business abroad in special tools and power transmission equipment report but a moderate volume of orders, which are usually small individually.

There has probably been a little more business transacted in the second-hand machinery market. Machinery merchants as well as second-hand dealers have made some fair sales of second-hand equipment recently, inasmuch as quite a few tools, which have but little active service, have become available and find fairly ready buyers owing to their reduced cost. Sales cover quite a varied range of equipment, but the bulk of the business is confined to tools of the smaller classes.

Considerable variation is to be noted in the reports of foundries as to the volume of business during the month. Some have gained materially, others have not, but on the whole a slight betterment about represents the condition of the trade. Orders are usually for prompt shipment, consumers still refraining to place business in advance of their needs.

The property of the Heindel Mfg. Company, Hanover, Pa., which was recently declared a bankrupt, will be sold by George D. Gitt, trustee, at public sale at the above location, November 14. The sale will include all the real estate, buildings, tools, &c. Efforts will be made to sell it as a complete manufacturing plant.

The District of Columbia will advertise for bids in the near future for an extension to the water system, duplicating the supply, and for fire protection to the Home for the Aged and Infirm, at Blue Plains. An addition will be made to the power house, and an elevated tank of 23,000 gal. capacity, pumps, artesian well, pipe lines, &c., will be required. W. L. Webster is superintendent of construction, 104 District Building, Washington, D. C.

The Hess Machine Works reports no particular increase in the volume of business taken during the month. The outlook for the future, however, is considered a shade better, both for export and domestic orders. Business recently has been somewhat irregular, but includes among others orders for two sets of file making machines for export to Russia, as well as several for domestic customers. A slight betterment is also noted in the demand for machinery equipment of a special nature.

The Baldwin Locomotive Works reports an improvement in the demand. Quite a number of orders for small lots of engines have been received, while one for 12 locomotives of the Atlantic type has been received from the Chicago, Milwaukee & St. Paul Railroad. The business booked has shown recently the best increase since the first of the year. The plant continues in operation with greatly reduced forces, but more encouragement regarding the future is expressed.

The W. E. Shipley Company, machinery merchant, Bourse Building, Machinery Hall, has purchased the entire remaining equipment of the late George H. Jones Motor Company, Camden, N. J. The equipment includes lathes, planers, grinders, presses, special machinery motors, forges, &c. The Shipley Company reports a fair volume of business during the month, but not as large as in the previous one. The outlook for the future is fair, as quite a considerable amount of new business is being figured on.

Willson, Harris & Richards, architects and engineers, are engaged in preparing plans for a four-story brick addition, 85 x 225 ft., to the manufacturing plant of Fels & Co., Seventy-third street and Woodland avenue, Philadelphia.

Government Purchases.

WASHINGTON, D. C., November 2, 1908.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until November 21 for a 5000 cu. ft. air compressor and accessories for each of the navy yards at Boston, Mass., and Mare Island, Cal.

The Isthmian Canal Commission will receive bids until November 23, Circular No. 476, for a quantity of supplies, including tapping machines, pipe cutter, test pump, &c.

The Isthmian Canal Commission will receive bids until November 27, Circular No. 477, for steel dump barges.

Bids will be received at the office of the Superintendent of Prisons, Washington, D. C., until November 30, for a 25-hp. electric motor for the penitentiary at Atlanta, Ga.

The Isthmian Canal Commission will soon ask bids for five Scotch marine boilers, a wood boring machine, &c.

The following bids were opened October 22, Circular No. 471, for machinery for the Isthmian Canal Commission:

Class 1.—One locomotive crane and one grab bucket—Bidder 30, Brown Hoisting Machinery Company, Cleveland, Ohio, \$9173; 32, Browning Engineering Company, Cleveland, Ohio, \$7966.25; 117, Industrial Works, Bay City, Mich., \$8480; 120, Interstate Engineering Company, Bedford, Ohio, \$9700; 244, American Hoist & Derrick Company, St. Paul, Minn., \$6958, with 1½-yard bucket, \$921.06, 2½-yard bucket \$1206.47, 2-yard bucket \$1028.24 must be added.

Class 3.—Forty duplex horizontal oil pumps—Bidder 42, Central Metal & Supply Company, Baltimore, Md., \$1990; 77, Fairbanks, Morse & Co., Chicago, Ill., \$1820; 84, Fox Brothers & Co., New York, \$2470; 90, Gardner Governor Company, Quincy, Ill., \$2235; 147, Manning, Maxwell & Moore, New York, \$2595.60 and \$2810; 159, Motley, Green & Co., New York, \$1890; 163, National Electrical Supply Company, Washington, D. C., \$2461.50; 189, Platt Iron Works Company, Dayton, Ohio, \$2590; 193, Queen City Supply Company, Cincinnati, Ohio, \$2520.50; 241, Henry R. Worthington, New York, item 3, 30 pumps, \$1429.50, \$1609.80, \$2310.60, \$2249.40; for ten pumps, \$1163.10, \$1113.90, \$914.90.

Class 4.—Fourteen duplex horizontal plunger pumps—Bidder 42, Central Metal & Supply Company, Baltimore, Md., \$2226; 70, Emerson Steam Pump Company, Alexandria, Va., \$3105; 77, Fairbanks, Morse & Co., Chicago, Ill., \$1778; 84, Fox Brothers & Co., New York, \$2055.98; 90, Gardner Governor Company, Quincy, Ill., \$2430; 147, Manning, Maxwell & Moore, New York, \$2344 and \$3010; 159, Motley, Green & Co., New York, \$2050; 163, National Electrical Supply Company, Washington, D. C., \$2658.60; 189, Platt Iron Works Company, Dayton, Ohio, \$2290; 193, Queen City Supply Company, Cincinnati, Ohio, \$2721.90; 241, Henry R. Worthington, New York, six pumps, \$941.10, \$586.26, \$1968.12; two pumps, \$1040.82, \$608.74; six pumps, \$1339.32.

Class 5.—Fourteen duplex vertical feed pumps—Bidder 42, Central Metal & Supply Company, Baltimore, Md., \$2090; 57, M. T. Davidson Company, New York, \$1718; 77, Fairbanks, Morse & Co., Chicago, Ill., \$2028; 84, Fox Brothers & Co., New York, \$2133; 90, Gardner Governor Company, Quincy, Ill., \$1764; 147, Manning, Maxwell & Moore, New York, \$2475; 159, Motley, Green & Co., New York, \$2511.50; 163, National Electrical Supply Company, Washington, D. C., item 6, \$617.40; 189, Platt Iron Works, Dayton, Ohio, \$2492; 193, Queen City Supply Company, Cincinnati, Ohio, item 6, \$632.10; 241, Henry R. Worthington, New York, item 5, two pumps, \$834.10; two pumps, \$570.06; six pumps, \$1389.60 and \$717.66; item 6, \$449.70.

Class 6.—One pneumatic line welder—Bidder 84, Fox Brothers & Co., New York, \$699 and \$598; 159, Motley, Green & Co., New York, \$685; 174, R. J. O'Neil, Denver, Colo., \$309; 204, Joseph T. Ryerson & Son, Chicago, Ill., \$410.

Class 7.—Three arbor presses—Bidder 18, Edwin E. Bartlett, Boston, Mass., \$121, accepted; 141, Lucas Machine Tool Company, Cleveland, Ohio, \$885.

The following bids were opened October 26, Circular No. 472, for machinery for the Isthmian Canal Commission:

Class 1.—One piston pump—Bidder 50, Fairbanks, Morse & Co., Chicago, Ill., \$56 and \$62; 56, Fox Brothers & Co., New York, \$68; 58, Gardner Governor Company, Quincy, Ill., \$64; 93, Manning, Maxwell & Moore, New York, \$87 and \$90; 102, Motley, Green & Co., New York, \$75; 108, National Electrical Supply Company, Washington, D. C., \$83; 127, Queen City Supply Company, Cincinnati, Ohio, \$79.80; 171, Henry R. Worthington, New York, \$126.

Class 2.—One plate straightening machine—Bidder 13, Bertsch & Co., Cambridge City, Ind., \$1090; 56, Fox Brothers & Co., New York, \$986.32; 93, Manning, Maxwell & Moore, New York, \$1350; 114, Niles-Bement-Pond Company, New York, \$1520; 140, William Sellers & Co., Philadelphia, Pa., \$1710.

Class 3.—Seven direct connected generators and engines—Bidder 35, D'Oiler Engineering Company, Philadelphia, Pa., \$2485; 41, Electric Machinery Company, Minneapolis, Minn., \$2502.50; 45, Erie Mfg. & Supply Company, Erie, Pa., \$4200; 55, Fort Wayne Electric Works, Fort Wayne, Ind., \$2317; 56, Fox Brothers & Co., New York, \$3338.93; 61, General Electric Company, Schenectady, N. Y., \$2989; 63, A. D. Granger Company, New York, \$3143; 78, Interstate Electric Company, New Orleans, La., \$2100; 98, August Mletz, New York, \$4865; 115, Northern Electric Mfg. Company, Madison, Wis., \$2366; 148, Sprague Electric Company, New York, \$2608.20; 154, B. F. Sturtevant Company, Hyde Park, Mass., \$2695; 165, Western Electric Company, New York, \$2352; 166, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., \$2377.

The following bids were opened October 27 for machinery for the navy yards:

Class 1.—One four-wheeled switching locomotive—Bidder 10, American Locomotive Company, New York, \$5450 and \$4250; 40, Burnham, Williams & Co., Philadelphia, Pa., \$4850; 84, Davenport Locomotive Works, Davenport, Iowa, \$4230; 156, Lima Locomotive & Machine Company, Lima, Ohio, \$4200 and \$6800; 224, H. K. Porter Company, Pittsburgh, Pa., \$4435 and \$6625; 294, Vermilye & Power, New York, \$5095 and \$8500; 296, Vulcan Iron Works, Wilkes-Barre, Pa., \$4100 and \$6300.

Class 11.—Two heavy pattern upright drills—Bidder 70, Compressed Air Machinery Company, San Francisco, Cal., \$432; 92, Frevort Machinery Company, New York, \$414; 124, Hen-

shaw, Bulkley & Co., San Francisco, Cal., \$390; 125, Harrou, Ricard & McCone, San Francisco, Cal., \$438 and \$365.70; 174, Manning, Maxwell & Moore, New York, \$410 and \$415; 198, Niles-Bement-Pond Company, New York, \$433; 225, Pacific Tool & Supply Company, San Francisco, Cal., \$409.

Class 12.—Two nipple and pipe mill machines—Bidder 124, Henshaw, Bulkley & Co., San Francisco, Cal., \$900; 125, Harrou, Ricard & McCone, San Francisco, Cal., \$962.50, \$620 and \$440; 294, Vermilye & Power, New York, \$574.

Class 51.—One five-ton foundry furnace—Bidder 133, Hawley Down Draft Furnace Company, Chicago, Ill., \$4020.08; 166, Marks Fuel Oil Equipment Company, Norfolk, Va., \$3495.

Class 111.—One single traveling head shaping machine—Bidder 174, Manning, Maxwell & Moore, New York, \$2375; 198, Niles-Bement-Pond Company, New York, \$2475.

Class 112.—One single head motor driven bolt cutter—Bidder 94, Fairbanks Company, New York, \$640; 163, Landis Machine Company, Waynesboro, Pa., \$760; 174, Manning, Maxwell & Moore, New York, \$670; 288, Tucker Tool & Machine Company, New York, \$540.

Class 113.—One floor grinder—Bidder 67, James Clark, Jr., Electric Company, Louisville, Ky., \$139.50; 94, Fairbanks Company, New York, \$139.50; 211, Oliver Machinery Company, New York, \$139.50; 217, S. M. Price Machinery Company, Norfolk, Va., \$138; 244, Ransom Mfg. Company, Oshkosh, Wis., \$158; 288, Tucker Tool & Machine Company, New York, \$260.

Class 141.—Direct current equipment for 50-ton Niles electric traveling crane—Bidder 49, Cleveland Crane & Engineering Company, Wickliffe, Ohio, \$2490; 198, Niles-Bement-Pond Company, New York, \$1775 and \$1350.

Class 151.—Four inclosed motors—Bidder 35, Burke Electric Company, Erie, Pa., \$1331; 76, D'Olier Engineering Company, Philadelphia, Pa., \$1360; 89, Electro Dynamic Company, Bayonne, N. J., \$1196; 115, General Electric Company, Schenectady, N. Y., \$1509; 134, Holtzer-Cabot Electric Company, Brookline, Mass., \$1274.23; 178, Manhattan Supply Company, New York, \$1267.20; 195, Northern Electric Mfg. Company, Madison, Wis., \$4367; 257, B. F. Sturtevant Company, Hyde Park, Mass., \$1156.70; 265, Sprague Electric Company, New York, \$1127; 301, Wickes Brothers, Saginaw, Mich., \$1267; 309, Western Electric Company, New York, \$1225.60.

Class 152.—Three portable electric blowers—Bidder 76, D'Olier Engineering Company, Philadelphia, Pa., \$90; 134, Holtzer-Cabot Electric Company, Brookline, Mass., \$85; 201, National Electrical Supply Company, Washington, D. C., \$123; 275, Sirocco Engineering Company, New York, \$160.

Class 154.—One combination tool grinding and sharpening machine—Bidder 18, Baldwin, Tuthill & Bolton, Grand Rapids, Mich., \$71.50; 77, Drew Machinery Agency, Manchester, N. H., \$81.50; 92, Frevert Machinery Company, New York, \$70.

Class 155.—One punching and shearing machine—Bidder 64, Cleveland Punch & Shear Works, Cleveland, Ohio, \$2750 and \$2200; 137, Hillis & Jones Company, Wilmington, Del., \$2600; 198, Niles-Bement-Pond Company, New York, \$2945; 228, Prentiss Tool & Supply Company, New York, \$2793; 301, Wickes Brothers, Saginaw, Mich., \$2623.75.

Class 156.—One motor driven cut-off machine—Bidder 15, American Wood Working Machinery Company, Rochester, N. Y., \$223; 65, Cordesman-Rechtin Company, Cincinnati, Ohio, \$464.75; 91, J. A. Fay & Egan Company, New York, \$385.35 and \$635.25; 211, Oliver Machinery Company, New York, \$525; 268, H. B. Smith Machine Company, Smithville, N. J., \$360.50.

Class 157.—One automatic railroad cut-off saw—Bidder 15, American Wood Working Machinery Company, Rochester, N. Y., \$360; 36, Bentell & Margedant Company, Hamilton, Ohio, \$455; 91, J. A. Fay & Egan Company, New York, \$594.30; 112, Greenlee Brothers Company, Chicago, Ill., \$586; 174, Manning, Maxwell & Moore, New York, \$490; 330, S. A. Woods Machine Company, South Boston, Mass., \$658.

Class 158.—One bevel hand saw—Bidder 15, American Wood Working Machinery Company, Rochester, N. Y., \$408; 36, Bentell & Margedant Company, Hamilton, Ohio, \$420; 65, Cordesman-Rechtin Company, Cincinnati, Ohio, \$421.64; 77, Drew Machinery Agency, Manchester, N. H., \$473; 91, J. A. Fay & Egan Company, New York, \$454.65; 92, Frevert Machinery Company, New York, \$438; 93, Fairbanks Company, New York, \$405; 108, Greaves, Klusman & Co., Cincinnati, Ohio, \$443; 174, Manning, Maxwell & Moore, New York, \$735; 211, Oliver Machinery Company, New York, \$518; 237, B. M. Root Company, York, Pa., \$435; 303, White Tool & Supply Company, Cleveland, Ohio, \$437.50; 325, Fox Machine Company, Grand Rapids, Mich., \$468.

Class 159.—One improved jointing and facing machine—Bidder 15, American Wood Working Machinery Company, Rochester, N. Y., \$200; 36, Bentell & Margedant Company, Hamilton, Ohio, \$233; 77, Drew Machinery Agency, Manchester, N. H., \$188.32; 91, J. A. Fay & Egan Company, New York, \$292.95; 92, Frevert Machinery Company, New York, \$154; 93, Fairbanks Company, New York, \$155; 108, Greaves, Klusman & Co., Cincinnati, Ohio, \$216; 112, Greenlee Brothers Company, Chicago, Ill., \$353; 174, Manning, Maxwell & Moore, New York, \$355; 211, Oliver Machinery Company, New York, \$254 and \$298; 268, H. B. Smith Machine Company, Smithville, N. J., \$215; 325, Fox Machine Company, Grand Rapids, Mich., \$238.

Class 160.—One universal saw bend—Bidder 15, American Wood Working Machinery Company, Rochester, N. Y., \$497; 36, Bentell & Margedant Company, Hamilton, Ohio, \$485; 65, Cordesman-Rechtin Company, Cincinnati, Ohio, \$470.10; 91, J. A. Fay & Egan Company, New York, \$595.35; 112, Greenlee Brothers Company, Chicago, Ill., \$684; 174, Manning, Maxwell & Moore, New York, \$600; 211, Oliver Machinery Company, New York, \$588, \$627 and \$648; 228, Prentiss Tool & Supply Company, New York, \$464.40; 268, H. B. Smith Machine Company, Smithville, N. J., \$463.70; 325, Fox Machine Company, Grand Rapids, Mich., \$559.

Class 162.—One independent dove tailer and variety shaper—Bidder 15, American Wood Working Machinery Company, Rochester, N. Y., \$354.40; 65, Cordesman-Rechtin Company, Cincinnati, Ohio, \$287.28; 91, J. A. Fay & Egan Company, New York, \$365.40; 173, Montgomery & Co., New York, \$374; 174, Manning, Maxwell & Moore, New York, \$255; 178, Manhattan Supply Company, New York, \$396.

Class 163.—One power wiring machine—Bidder 77, Drew Machinery Agency, Manchester, N. H., \$107.15; 173, Montgomery & Co., New York, \$99; 178, Manhattan Supply Company, New York, \$104.50; 328, Knox & Brother, New York, \$83.30.

Class 164.—One rod and dowel machine—Bidder 15, American Wood Working Machinery Company, Rochester, N. Y., \$203; 36, Bentell & Margedant Company, Hamilton, Ohio, \$195; 91, J. A. Fay & Egan Company, New York, \$178.50; 92, Frevert Machinery Company, New York, \$194; 228, Prentiss Tool & Supply Company, New York, \$158.

Class 165.—One No. 3 improved drilling and tapping machine—Bidder 77, Drew Machinery Agency, Manchester, N. H., \$1873; 173, Montgomery & Co., New York, \$1814.95; 174, Manning, Maxwell & Moore, New York, \$1825; 178, Manhattan Supply Company, New York, \$1874; 228, Prentiss Tool & Supply

Company, New York, \$1535; 294, Vermilye & Power, New York, \$1850; 328, Knox & Brother, New York, \$1953.

Class 167.—One band resawing machine—Bidder 15, American Wood Working Machinery Company, Rochester, N. Y., \$1291; 36, Bentell & Margedant Company, Hamilton, Ohio, \$1380; 39, Berlin Machine Works, Beloit, Wis., \$1415; 65, Cordesman-Rechtin Company, Cincinnati, Ohio, \$1289; 91, J. A. Fay & Egan Company, New York, \$1571.85 and \$1273.65; 170, W. D. Mershaun & Co., Saginaw, Mich., \$1580.65; 268, H. B. Smith Machine Company, Smithville, N. J., \$1414.

Class 169.—One improved core machine—Bidder 97, Falls Rivet & Machine Company, Cuyahoga Falls, Ohio, \$254; 173, Montgomery & Co., New York, \$262; 294, Vermilye & Power, New York, \$265.

Class 170.—One automatic circular grinding machine—Bidder 18, Baldwin, Tuthill & Bolton, Grand Rapids, Mich., \$192.60; 92, Frevert Machinery Company, New York, \$198; 211, Oliver Machinery Company, New York, \$200; 314, Walter A. Zellecker Supply Company, St. Louis, Mo., \$175.

Class 171.—One motor driven power press—Bidder 160, Loy & Nawrath Company, Newark, N. J., \$1943; 174, Manning, Maxwell & Moore, New York, \$1675; 213, George A. Ohl & Co., Newark, N. J., \$1950; 228, Prentiss Tool & Supply Company, New York, \$2155.

Class 240.—One punch and shear—Bidder 17, Buffalo Forge Company, Buffalo, N. Y., \$73; 28, John Brown & Son, Baltimore, Md., \$95; 94, Fairbanks Company, New York, \$80; 174, Manning, Maxwell & Moore, New York, \$73; 178, Manhattan Supply Company, New York, \$90; 240, William Reed & Son, Boston, Mass., \$96.25.

Bids were opened October 26 at the office of the Isthmian Canal Commission for two four-wheel saddle tank locomotives, as follows:

G. & W. Mfg. Company, New York, \$7546; Davenport Locomotive Works, Davenport, Iowa, \$6288; American Locomotive Company, New York, \$6300; H. K. Porter Company, Pittsburgh, Pa., \$6040; Lima Locomotive & Machine Company, Lima, Ohio, \$5800; Vulcan Iron Works, Wilkes-Barre, Pa., \$5900.

The following bids were opened by the Superintendent of Prisons, Washington, D. C., October 26, for ice making machinery for the Atlanta penitentiary:

Arctic Ice Machine Company, Canton, Ohio, \$510; Fred W. Wolf Company, Chicago, Ill., \$425; Pillsbury-Becker Engineering & Supply Company, St. Louis, \$740.48; Henry Vogt Machine Company, Louisville, Ky., \$510; Creamery Package Mfg. Company, Chicago, Ill., \$476; Triumph Ice Machine Company, Cincinnati, Ohio, \$550; Ruemmel-Dawley Mfg. Company, St. Louis, Mo., \$598; Tate-Nordmeyer Engineering Company, St. Louis, Mo., \$599; Brunswick Refrigerating Company, New Brunswick, N. J., \$595; Vilter Mfg. Company, Milwaukee, Wis., \$680.50; Fisher Machine Works Company, Leavenworth, Kan., \$572; Gardner Governor Company, Quincy, Ill., \$42 and \$35 for pump; Reaves & Skinner Mfg. Company, St. Louis, Mo., \$33 for pump; Canton Boiler & Engineering Company, Canton, Ohio, \$510.

The Sullivan Machinery Company, Chicago, Ill., has been awarded contract for an air compressor for Fort Washington, Md.

The following awards have been made for machinery for the navy yards, bids for which were opened September 8:

Harron, Ricard & McCone, San Francisco, Cal., class 1, one No. 4 high power universal milling machine, \$2522; class 4, one upright drill, \$367.50; class 5, one 14-in. lathe, \$956.36; class 6, two lathe holders, \$1172.82.

Niles-Bement-Pond Company, New York, class 2, one vertical boring and turning mill, \$3993.

Alliance Machine Company, Alliance, Ohio, class 161, one plate joggling machine, \$3895.

Under bids opened October 12, Circular No. 468, for machinery for the Isthmian Canal Commission, the Western Electric Company, New York, has been awarded class 10, one generator, \$915.

Under bids opened October 20 for machinery for the navy yards, the Warren Steam Pump Company, New York, has been awarded class 132, one duplex fire pump, \$463.

Edge's Weight Computer for Structural Shapes.—

Engineers, draftsmen and others having to do with computations involving the weights of steel shapes will find useful a contrivance manufactured and sold by the Edge Computer Sales Agency, St. Paul Building, New York. The device is mounted on heavy cardboard, 9½ in. square, with metal corners. A cover paper contains on the inside instructions for its use. A circular graduated disk of two diameters and with a tab is pivoted at its center and plays over circular graduations on the board. Certain scales are used for finding the weights of plates, angles and beams when the dimensions are given. The scales are logarithmic and the principle of the computer is similar to that of a slide rule. It is accurate to within about one-third of 1 per cent. The computer sells for \$2.

Standardization of spark plugs for automobiles has been attempted by the Association of Licensed Automobile Manufacturers. The mechanical branch of this association for some time has been working on proposed standards for the dimensions. The form now agreed upon has a ¾ in. diameter of thread 18 pitch, a shouldered or flanged seat 1½ in. in diameter, a minimum length below the shoulder of ½ in. and a hexagon head ¾ in. across the flats.

HARDWARE

DENATURED alcohol has in this country been thus far a disappointment. The great things to be accomplished by means of it as a source of power, illumination and heat have to no great extent materialized. It is but an insignificant factor industrially and commercially. Unwise legislation has perhaps had something to do with this tardy development. Under the old law it was not practicable to manufacture the alcohol on a small scale, as the legal restrictions on its manufacture left its production largely to great concerns who would make it in large quantities. The new alcohol law is, however, much more favorable to the establishment of distilling plants of moderate size. It is possible that further progress should be made in the modification of the law so as to encourage or at least permit the producing of the alcohol locally, on a scale that will be most advantageous to the farmers throughout the country, so as to insure a lower cost of manufacture than has yet been reached. There is certainly no reason why the price in this country should not be materially reduced. The course of things abroad, notably in Germany, has been such as to justify the hope that industrial spirits may yet play an important part in this country in furnishing the public with cheap and efficient fuel and light, and at the same time in advancing the welfare of the farmers whose products will enter into the production of the alcohol, of which in turn so many uses can be found in connection with farming operations and rural life.

While the development of the manufacture of denatured alcohol has been thus slow and disappointing, there has been a correspondingly low production of the utensils and appliances which are called for in its use. With the increased prospect of a lower price for the spirits there is, however, a quickening of enterprise on the part of manufacturers of appliances in which it can be used. Until quite recently the denatured alcohol industry, with respect to utilities for its consumption, was in the condition characteristic of many new enterprises. Until within a short time the products of American manufacturers were few in number, although of high efficiency and quality, and users of alcohol were obliged to depend upon imported appliances of varying merit. Since it became apparent that the new alcohol law could be administered under regulations relieved of the drastic features originally adopted by the Internal Revenue Bureau, the production of utilities in this country has, however, received a very decided impetus. An excellent opportunity to inspect all the principal lines of appliances for the consumption of denatured alcohol, including Stoves, Lamps, Laundry Irons, Chafing Dishes, Refrigerators, &c., will be afforded Hardware merchants and the public during the coming annual convention of the National Grange, Patrons of Husbandry, to be held in Washington, November 10 to 20. During the convention an elaborate exhibit of these appliances will be open to the public, the object of the Grange being to increase the demand for the utilities which, if generally distributed, will insure the consumption of an enormous quantity of denatured spirits and render it practicable for farmers in all sections to produce and denature alcohol even in competition with the largest distilling establishments now engaged in its manufacture. This whole subject is one deserving the best attention of the Hard-

ware trade, to whom is left so largely the making and distribution of the utilities and appliances employed in the consumption of denatured alcohol.

Condition of Trade.

Whatever difference of opinion may have found expression during the campaign, it is a matter of congratulation in which all may unite that there is no doubt as to the result. If it were a matter of uncertainty, the formal and final decision depending on the canvassing of votes in doubtful States, or the precarious action of returning boards and courts, it would be a national calamity, fraught with immediate peril to commercial and industrial interests. For the decisiveness of the verdict, whether welcome or unwelcome, there may be rejoicing among the victors and the vanquished alike. It is now known, as far as the question can be determined at the polls, what in general will be the policy of the new administration. The promise of a judicious and conservative administration will have influence in increasing public confidence, and thus tend to promote activity in business, and enterprise on the part of capital. The energies, too, which have dissipated in other directions, or held in abeyance, may now be devoted to productive efforts in the field of business. The quickening of trade along regular lines is to be looked for, with a gradual broadening of enterprise and expenditure, thus continuing the progress toward recovery. While large and exceptional outlays by railroads and great corporations are not to be expected as long as the fundamental questions in regard to State and National control are unsettled problems, the usual course of business, responding to the consuming efficiency of 80,000,000 well to do people, will keep in movement great quantities of products agricultural and manufactured, and give, at least, a fair degree of occupation to factories and merchants through the length and breadth of the land. The situation is an interesting one, with enough still of uncertainty to call for conservatism and prudence, but with sufficient foundation of assured well being to give confidence and courage. It is a situation in which each man by prosecuting his own business with energy and in a hopeful spirit will be advancing the public welfare.

Chicago.

There is no doubt but that a good deal of business during the past month, and especially in the last fortnight, has been held back awaiting the outcome of election. Indeed, it was apparent from current comment that business interests were more concerned as to future developments than with present conditions. And while it seems to be the policy of every one to move slowly, accepting no unnecessary risks, yet there is and has been a remarkable unanimity of confidence and deep seated belief on every hand that whatever might befall politically the commercial and industrial interests of the country cannot be permanently halted, but must, in the nature of things, rise superior to whatever obstacles that may develop. In noting characteristic features of trade at the present time, the representative of a leading Hardware manufacturer observed that the number of orders coming in is quite satisfactory, as is the average list of items thereon, but the quantities represented by each item are much smaller than is ordinarily the case, showing that buyers have not ceased to carefully restrict purchases to immediate necessities. This pruning process, as is well known, has been going on for some time, with the

natural result of reducing stocks to the closest possible limit. The practice, moreover, has not been confined to the retail trade alone, but has characterized the buying of the jobbing trade as well. In view of these facts, some experienced merchants are beginning to question the wisdom of the ultraconservatism along these lines. It is argued that the soundness of basic conditions warrant—in any case—the expectation of a steady, if slow, increase in demand, with the possibility of its swelling more rapidly than is anticipated. A sudden spurt of buying, if lasting but a few weeks, would, with the stocks now in hand both in factory and warehouses, cause a sudden influx of orders that would precipitate temporary congestion. Looking at the situation from this view point, some buyers are beginning to order with a little more liberality, but at the same time exercising conservative caution against overoptimistic estimates. It is too early to determine what response will be made to the new prices announced last week on Poultry Netting and Hardware grade Wire Cloth. Considering the reduction of 7½ per cent. offered in the schedule from last year's prices, the leading distributors anticipate a generous volume of first orders for spring shipment. Prices on Painted Wire Cloth have not yet been given out, but will probably be announced before the middle of November.

Boston.

BIGELOW & DOWSE COMPANY.—Since the middle of August there has been a slight improvement in trade throughout New England, and it seems fair to say that the Hardware jobbers have done a normal business as compared with last year—while some claim a slight increase in sales. There is surely a better feeling and more inclination to place orders in anticipation of a fair business in the future.

Stocks are low, but are generally well assorted. It is not necessary for the jobbers to carry large stocks, while the factories are in shape to make prompt shipments and the retailers appreciate the advantage of having reduced their oversupply, and will be more cautious in future purchases. Before the panic nearly every one had gone

beyond a safe limit in buying, but having reduced their stocks as well as their liabilities they will not hasten to overburden themselves again.

Improved conditions must come gradually, and we do not look for a great rush of trade even if the Republican ticket is elected. The last convention of the National Hardware Association in October, 1907, marked the commencement of the panic; let us hope that their next meeting at Memphis the present month may mark its ending.

Portland, Oregon.

FAILING-MCCALMAN COMPANY.—In this the last week before the national election we are for the first time feeling a little something of the ante-election dullness, but this dullness has no promise of continuing. All houses in our line in Portland report an excellent business and have every reason for expecting an indefinite continuance of the same.

This year all our producing industries have been in a flourishing condition, excepting only the lumbering interest, and now we believe we can say that this is not only beginning to look up but is looking up decidedly, as we hear of the reopening of mills that have been shut down for some time. We therefore expect the remaining two months of the year to show a decided improvement in business over the rest of the year.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—We are suffering from a prolonged drought, one of the longest we ever had in this section. It has done no very serious damage, as it commenced about the time the crops were maturing. A good rain would certainly add materially to the comfort of the people and somewhat to the health of the community, and would be a wonderful restorer to pasture lands.

The night riders in the tobacco section of the country who have done so much to injure business it seems have spread over into Tennessee, where they started out with a pretty strong organization. The firm stand, however,

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taken by our State authorities will no doubt have a good effect in wiping out this clan not only in Tennessee, but in other Southern States.

While business is not satisfactory in this section of the country, we are glad to say that we have just closed the best month's business we have had since the financial troubles October last year. This is, to say the least, encouraging. It is the universal prediction of all classes of people that business will be good after election. We ourselves don't know of any reason why this should be the starting point of good business, but think rather that the increase would be gradual each month; but we are perfectly willing to join in the procession on the morning of the 4th and "whoop things up at a lively rate."

We are unable to give any reason why business should not be good. The country seems to be in a prosperous condition; there seems to be more lack of confidence than lack of money. The knowing ones say confidence will be restored on November 3. "Here's hoping it will."

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—Business keeps up remarkably well, when one considers that the whole central part of the country has been afflicted with a drought until we are threatened with a lapse into the infertility of Sahara and considering that we are also afflicted with a flood of campaign eloquence, which does not compensate for the lack of cloud sent moisture.

The cartoons grow more and more pointed and the collectors of campaign funds grow more persistent as the great climax approaches. The claims set up by the rival candidates for the labor vote and the negro vote are rung into the newspaper columns day by day. The last purchased hats are all too small for most of these gentlemen for the next few days. After that we shall expect to see a gradual shrinkage, no matter which way the election goes.

Locally much interest is centered in the action of Tennessee's chief executive in laying hold of the night rider question as vigorously as he has done in person. Personal ease, political engagements and everything else were relegated to a secondary place for the time being in order that these violators of the law should be apprehended and dealt with as they deserve. It has set an example to the governors of the other States, and should the night riders attempt to regulate the price of tobacco, cotton or catfish they will most likely find an obstacle in fearless officers of the law and grand juries as well. We are bound to get out of this mediævalism which has cast a blight upon certain rural districts in this part of the country for the past year or so.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—The month of October has kept up the fair promise made by September and has been extremely satisfactory. The volume of sales has been very heavy.

At the time this is written the election is still several days off and there has been a little slackening up in the volume of business, which is usual just before a national election. We are quite sure the country will be safe no matter what happens, and look forward with confidence to a large business the balance of the year and in the spring of 1909.

St. Louis is having her usual beautiful Indian summer weather, which occurs at this time of the year and makes this section of the country so attractive in the autumn.

Harvest is practically over and farmers are turning their attention to improvements and betterments on their places. Verily, this has been a wonderful year for the farmer—abundant crops, with extraordinarily high prices for almost every commodity he raises.

Prices for spring goods are being made gradually and everybody is on the *qui vive* to secure orders for future shipment.

Collections are good, prices are firm and the outlook is generally healthy and encouraging.

Cleveland.

W. BINGHAM COMPANY.—About the time this edition of *The Iron Age* goes to press the die will have been cast

as to which of the two great parties shall dominate the policy under which our country shall run for the next four years. Both candidates will have been weighed in the balance and the voters will have registered their opinion as to which of the two men should be elected to the great office of President of the United States to rule over us for the next four years. Surely, we will all be very grateful when this tension is off and business and the general welfare of the country become the paramount issue. Many large deals have been deferred until this great political question is settled.

The general trend of business in this section at the present time is very good, and we enter the fall season knowing that customers are in need of many goods that they have delayed taking into stock early. Now they are placing orders in more liberal quantities than in former months. Quite a good deal of new business is being booked for shipment the fore part of next year. After November 3 we look for a great revival of trade in all its branches.

Holiday goods are being purchased and are going forward in good quantities. It is surprising the amount of Nails and Wire that is being sold and shipped, especially at this time of the year. Perhaps this is on account of the unusually pleasant fall weather we have had, enabling a great many jobs that it was thought impossible to finish before bad weather set in to be completed before the first of the year. We are looking hopefully into the future and believe we are going to have larger business in this section for the balance of this year, and we will be in shape for a splendid business start the first of the year.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—By the time *The Iron Age* reaches its various subscribers throughout the country the result of the Presidential election will be known. Presidential candidates are never discussed by the Hardware associations, and very few of the Hardware merchants in our country ever discuss this subject either with their customers or employees, but all hope that the conditions of next year will improve and run largely back to the conditions of 1906 and 1907, although it is generally considered the conditions of the last six months have been far less disastrous than feared in October, 1907, and less failures have occurred in the Hardware trade. To be sure, the trade have bought very carefully, not only fearing trouble, but knowing business would be somewhat held back by the consumers.

The weather was very, very warm and summerlike during the entire months of September and October, consequently there has been practically no call for winter goods. The first cold weather began on Friday, October 30, and on Saturday a few orders for goods used in winter were received. The weather is good now for fall trade, and we think should be very good for retailers' collections of funds from consumers.

NOTES ON PRICES.

Wire Nails.—The market shows a gratifying steadiness in demand as well as in prices. The output of the mills in October exceeded that of the previous month, and indications point to a continued activity. The demand has included new business and specifications on contract orders. Prices continue to be well if not in all cases inflexibly maintained. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$1.95
Carload lots to retail merchants.....	2.00
Less than carloads to jobbers.....	2.00
Less than carloads to retail merchants.....	2.10

Galvanized Nails are quoted at \$1 over the price of the regular Nails.

New York.—While the market has been comparatively quiet during the week, the movement of Nails has continued from day to day. A few orders have been placed for carloads by Nail houses for retail customers, so that in the event of a brisk demand on the mills after election they would not be annoyed by delay in having

their Nails shipped. Nails are held on the basis of \$2.30 per keg in small lots at store, but some sellers are occasionally inclined to shade this figure.

Chicago.—October business not only exceeded that of the preceding month, but overreached the total of the corresponding month a year ago. New orders are coming in at a rate which, under present conditions, is regarded as quite satisfactory, and shipments are keeping pace with the present mill capacity. While there is no general inclination to buy ahead of present requirements, there is, in this policy, an element of strength that tends to establish a firmer confidence in the steadiness of onward developments. Prices, we are advised, continue to be firmly maintained. Quotations are as follows: \$2.13 in car lots to jobbers, and \$2.18 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—The Wire and Wire Nail trades are more active at present than any of the other finished lines, actual new orders for Wire Nails and specifications against contracts received during October by the American Steel & Wire Company and the Pittsburgh Steel Company, the two leading producers, being much heavier than in September. In fact, the Wire Nail trade seems to be nearer getting back to a normal condition than any other finished line. Jobbers are showing a disposition to buy in larger quantities, and specifications against contracts are coming in very freely. We are advised that prices are being absolutely maintained by the mills, and there is every expectation that November business will show a healthy increase over October. Quotations for base sizes are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....\$1.95
Carload lots to retail merchants..... 2.00

Galvanized Nails are quoted at \$1 over the price of the regular Nails.

Cut Nails.—Demand continues upon about the same restricted basis as for some time, though a slight improvement is reported by manufacturers for October over that of September. Buyers follow the policy of restricting orders to necessities. The general price for Steel Cut Nails is \$1.80, base, per keg, f.o.b. Pittsburgh, for less than carloads, and \$1.75 for carloads and larger lots. In the Western market Iron Cut Nails are held at an advance of 10 cents per keg over Steel Cut Nails, but this differential is not observed in the East.

New York.—The demand has been comparatively light as compared with that for Wire Nails. Steel Cut Nails are held on the basis of \$2.15 per keg for small lots at store, but this price is not strictly adhered to by all sellers.

Chicago.—Slight improvement is noted in the demand for Cut Nails, but it has not reached a point that deserves special emphasis. There is no disposition on the part of buyers to increase their purchases beyond actual present requirements which call principally for small orders for prompt shipment. Prices are unchanged, with a possible shade of 5 cents a keg from regular quotations on carload orders. We quote Chicago prices as follows: In car lots to jobbers, Iron Cut Nails, \$2.08; Steel Cut Nails, \$1.98.

Pittsburgh.—The Cut Nail manufacturers have reaffirmed prices and report slight improvement in volume of new orders and also in specifications against contracts. We are advised that shipments of Cut Nails in October showed a slight increase over September. Prices are fairly firm, and \$1.75, Pittsburgh in carloads and larger lots seems to be minimum of the market. The general market is \$1.80, base, per keg, f.o.b. Pittsburgh, but \$1.75 is made, on carloads and over. In the Western market Iron Cut Nails are held at an advance of 10 cents per keg over Steel Cut Nails, but this differential is not observed in the East.

Barb Wire.—Business in this line is not as brisk as manufacturers anticipated it would be this fall. New orders have been received by the mills in limited quantity, but present conditions are looked upon as being more encouraging for an enlarged trade. Regular quotations are reported as being maintained. Quotations are

as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.10	\$2.40
Retailers, carload lots.....	2.15	2.45
Retailers, less than carload lots.....	2.25	2.55

Chicago.—New business has picked up considerably in the past week, and quite a number of good sized orders have been entered. The outlook for an increased tonnage this month is regarded as promising. Shipments are fairly heavy. Prices are reported to be satisfactorily maintained. Quotations are as follows: Jobbers, Chicago, car lots, Painted, \$2.28; Galvanized, \$2.58; to retailers, car lots, Painted, \$2.33; Galvanized, \$2.63; retailers, less than car lots, Painted, \$2.45; Galvanized, \$2.75; Staples, bright, in car lots, \$2.25; Galvanized, \$2.55; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—New orders being received by the mills for Barb Wire are still somewhat light, but it is confidently believed that November will show an increase over October. It is claimed that a good deal of new tonnage is being held up, pending the result of the election, and that this will be released as soon as this important event is out of the way. There is no denying the fact, however, that the trade in Barb Wire so far this fall has been a disappointment to the mills. It is stated that prices are being well maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.10	\$2.40
Retailers, carload lots.....	2.15	2.45
Retailers, less than carload lots.....	2.25	2.55

Plain Wire.—Fence manufacturers are the largest buyers of Plain Wire just now, but they are showing some conservatism in the size of their orders. A more liberal demand is looked for by the mills. Quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of \$1.80 for Plain and \$2.10 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the price to retailers being 5 cents additional:

Nos.	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....	\$1.80	1.85	1.90	1.95	2.05	2.15	2.25	2.35	
Galvanized.....	2.10	2.15	2.20	2.25	2.35	2.45	2.55	2.65	

Chicago.—Encouraged by a present and prospective demand for Fencing, of reasonably satisfactory proportions, Fence manufacturers are buying on a little more liberal scale; at the same time they have not abandoned that degree of conservatism which holds them against anticipating distant needs, yet the lines are not so closely drawn in this respect as was the case not long ago. Buying on a larger scale is looked for after the doubts of the election contest are cleared away. We are advised that prices are regularly maintained. We quote as follows: Car lots to jobbers, \$1.98, f.o.b. Chicago, and to retailers, \$2.05.

Pittsburgh.—Fence manufacturers are placing some fairly large orders, but are still inclined to the policy of buying only such Wire as they require in the near future. With the election out of the way it is believed the volume of new business in Plain Wire will soon show a decided increase. The mills advise us that prices are being well maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.10	\$2.40
Retailers, carload lots.....	2.15	2.45
Retailers, less than carload lots.....	2.25	2.55

Lawn Mowers.—The reduction in Lawn Mower prices as a result of competition, to which reference was made in our last issue, seems to have affected only the cheapest machines. On the lowest grade of Mowers prevailing quotations to average trade may be represented by an upset price for all sizes of \$2 per machine.

Picks and Mattocks, Etc.—The majority of manufacturers of Picks, Mattocks, Sledges and other heavy Tools are said to be in favor of higher prices, and large handlers of these goods express the belief that any pronounced improvement in demand will bring about an

immediate advance. Present quotations on Picks and Mattocks are low. The market may be represented in a general way by a discount of 75 and 10 per cent.

Wire Screen Cloth.—It is generally expected in the trade that the announcement of next season's price on Wire Screen Cloth will be made the latter part of this week.

Rope.—Business for October is regarded by some distributors of Rope as showing larger sales than any month during this past year. This does not mean that demand is normal. There has been, however, a gradual improvement in demand, though largely for small lots during the autumn. Jute products show more strength than others. General quotations for Rope, 7-16 in. in diameter and larger, are as follows: Pure Manila, 9 cents; Pure Sisal, 7 cents. Mixed grades of both kinds grade down in price according to quality. Jute Rope, ¼-in. and up, No. 1, 5¼ to 6 cents; No. 2, 5¼ to 5½ cents.

Spirits Turpentine.—The local market has shown but little activity during the week and the demand has been for small lots. Prices have dropped off about ½-cent per gallon. The New York market is represented by the following quotations: Oil Barrels, 39½ to 40 cents; Machine Made Barrels, 40 to 40½ cents per gallon.

White Lead.—During the past month the market for White Lead in Oil has shown considerable strength, notwithstanding the weakness in pig lead. While buyers have not been inclined to anticipate their requirements to the extent of placing contracts for future delivery, there has been a fairly satisfactory jobbing demand. Quotations for best brands are as follows: Lots of 500 lb. and over, in 100-lb. kegs and upward, 7 cents per pound; in lots of less than 500 lb., ½ cent per pound advance.

Linseed Oil.—The advance of 1 cent per gallon in Oil last week was largely speculative, based upon the reported damage by frost of the Argentine Flaxseed crop, which is believed by some to have been exaggerated, as such reports often are. While the card price shows the advance, the market is not strong at these figures. Demand for 5-barrel lots has been confined to nearby requirements. Quotations for 5-barrel lots are as follows: State and Western Raw, 42 cents per gallon; City Raw, 43 to 44 cents per gallon. Boiled Oil is 1 cent advance on Raw.

Window Glass.—The failure thus far to complete the manufacturers' organization has led to lower prices being named by some manufacturers, and the prevailing discounts are said to be about 90 and 30 per cent. for single strength and 90 and 40 per cent. for double strength Glass, from manufacturers' list, January 1, 1901. The fear has been expressed that if the arrangements for the manufacturers' organization cannot be perfected within the next two weeks, the American Window Glass Company, which is said to be carrying nearly a million boxes of machine made Glass, will be forced to put this on the market. If the company is obliged to do so some think that 90 and 50 per cent. discount will be about the current price. Monroe Lemon, secretary of the Columbia Glass Company, Wellsboro, Pa., has sent the following circular letter to the wholesale Window Glass trade:

Owing to the failure of a little more than a dozen Window Glass plants, all co-operative, principally in West Virginia, to sign up, the proposed selling agency plan is still in abeyance and cannot be consummated unless every factory joins. We inclose you herewith a list of the operating pots, showing the probable production up to March 1 of over 6,000,000 boxes. This quantity, you know, is ample for all needs up to October 1 next year, as the predicted consumption for this year is only 6,000,000 boxes. We understand that prices of 90 and 40 on single and 90 and 45 on double are freely being made. The American Company will certainly sell every box it produces, no matter how low prices go. If the jobbers are so inclined they need buy very little Glass between now and the first of the year, and in the meantime can reduce their own stocks to make room for lower priced glass. Neither manufacturers or jobbers can make any money under existing conditions. With 1910 pots in actual operation at present, it is not hard to predict that much lower prices will certainly rule in the near future, unless the proposed organization is carried to a successful conclusion at once.

We feel that every dealer should know these conditions as they exist, and be governed accordingly.

Accompanying this letter Mr. Lemon submits the following estimate of the Glass now in manufacturers' hands

and the quantity that would be produced by a 1910 pot capacity between October 1, 1908, and March 1, 1909:

	Boxes.
Estimated stock October 1, machine factories.....	750,000
Hand factories.....	250,000
Hand production, 30,560 boxes per day from October 1 to March 1 next, 130 days.....	3,972,800
Machine production, October 1 to March 1, five months.....	1,250,000

Total production, October 1 to March 1, five months.....6,222,800
Machine production to October 1, seven months.....1,750,000

Total.....7,972,800

Following is a list of 47 hand operated plants now in operation, having a capacity of about 1600 pots:

INDIANA.	
Blackford Window Glass Co., Vincennes.	Vincennes Window Glass Co., Vincennes.
KANSAS.	
Baker Bros. Glass Co., Caney.	Coffeyville Window Glass Co., Coffeyville.
Caney Glass Co., Caney.	Fredonia Window Glass Co., Fredonia.
Chanute Window Glass Co., Chanute.	Kansas Glass Co., Coffeyville.
Cheyenne Window Glass Co., Caney.	Osage Window Glass Co., Independence.
NEW YORK.	
Getman Glass Co., Cleveland.	
OHIO.	
Camp Glass Co., Mt. Vernon.	Enterprise Glass Co., Sandusky.
Case & Merry Co., Maumee.	Licking Window Glass Co., Utica.
Central Window Glass Co., Utica.	Utica Glass Co., Utica.
PENNSYLVANIA.	
Allegheny Window Glass Co.	Kane Window Glass Co., Kane.
American-French-Belgian Co., Du Bois.	Kerwin Window Glass Co., Eldred.
Consolidated Window Glass Co., Bradford and branches.	Masontown Window Glass Co., Masontown.
Eldred Window Glass Co., Punxsutawney.	New Bethlehem Window Glass Co., New Bethlehem.
Fairchance Window Glass Co., Fairchance.	Pennsylvania Window Glass Co., Kane.
Federated Glass Co., Point Marion.	Point Marion Glass Co., Point Marion.
Jeannette Glass Co., Point Marion.	Standard Window Glass Co., Kane.
WEST VIRGINIA.	
Crescent Window Glass Co., Weston.	Lafayette Window Glass Co., Clarksburg.
Clarksburg Window Glass Co., Clarksburg.	Marilla Window Glass Co., Morgantown.
Dunkirk Window Glass Co., South Charleston.	Patterson Window Glass Co., Cameron.
Fairmont Window Glass Co., Fairmont.	Peerless Window Glass Co., Clarksburg.
Grafton Window Glass Co., Weston.	Salem Co-operative Window Glass Co., Salem.
Ideal Window Glass Co., West Union.	Tuna Glass Co., Clarksburg.
W. R. Jones Glass Co., Morgantown.	Wells Glass Co., Slaterville.
	West Fork Glass Co., Clarksburg.

There are 104 hand operated plants, all told, in this country, and most of those not now in operation are probably ready to start up as soon as they see any prospect for making money.

The Sherwood Metal Working Company.

NEGOTIATIONS were concluded during the past week by which the Sherwood Metal Working Company, Syracuse, N. Y., manufacturer of Metal Frame Adjustable Window Screens, was consolidated with the large Screen manufacturing concerns whose combined product is sold through the Continental Company, Detroit, Mich. Up to this time the Continental Company has confined itself almost entirely to the Wood Screen business, but with the taking over of the Sherwood plant it will place on the market on a large scale the metal Screens which are being manufactured under the patents of W. E. Sherwood.

The company will immediately proceed to enlarge the Sherwood plant and a night force will be added to install new metal working machinery and equipment. Before the opening of the Screen business next year it is estimated that the plant will turn out a total of 200 carloads or 1,440,000 metal Screens. F. Q. Briggs of the John A. Roebbling's Sons Company, Trenton, N. J., recently bought a large interest in the company and was instrumental in consummating the deal. He has been elected one of the directors for the ensuing year.

E. C. ATKINS & Co., Indianapolis, Ind., have recently issued an attractively printed booklet entitled "Atkins Crosscut Saws," in which the special features and advantages of this product are forcibly pointed out. Illustrations are presented of a number of the Saws, and the company will be pleased to furnish copies of the booklet gratis on application.

FLORIDA RETAIL HARDWARE ASSOCIATION.

A LARGE and representative gathering of retail Hardware merchants from all parts of Florida assembled in the Board of Trade Auditorium, Jacksonville, on the 28th and 29th ult., and as a result of their deliberations the Florida Retail Hardware Association was organized. More than 30 well-known merchants became members of the association, and within 60 days it is confidently expected that the number of members will be nearly doubled. The call for the meeting, as we have already noted, was issued by W. K. Jackson, Jackson & Wilson Company, Lakeland. The meeting at the Board of Trade Auditorium followed an informal gathering in the parlors of the Aragon Hotel on Wednesday afternoon, when the preliminary arrangements for the organization were made.

In recognition of the valuable services of Mr. Jackson in inaugurating the movement he was chosen temporary chairman of the morning session, and W. Detwiler, Lakeland Hardware Company, Lakeland, temporary secretary. After the temporary organization was perfected S. B. Hubbard of the S. B. Hubbard Hardware Company, Jacksonville, delivered an address of welcome on behalf of the Hardware merchants of the city. The response to Mr. Hubbard's felicitous address was made by C. L. Wilson of the Bartow Hardware Company.

M. L. Corey, secretary of the National Retail Hardware Association, was present at the meeting, and substantially aided in the work of organization. He also delivered an able address in which he pointed out the benefits to be derived from an association of this kind.

Election of Officers.

The following officers were unanimously chosen:

PRESIDENT, M. E. Grouber, West Palm Beach.
VICE-PRESIDENT, B. F. Watts, Leesburg.
TREASURER, D. L. Thomas, Tampa.
SECRETARY, W. K. Jackson, Lakeland.
EXECUTIVE COMMITTEE: C. F. Smedley, Jacksonville; R. F. McNeil, Live Oak; M. B. Bates, Jr., Quincy.

Col. J. T. L. Brown, president of the Board of Trade of Tampa, and president of the State Fair Association, came before the association and extended a courteous and eloquent invitation to hold the next meeting in Tampa during the State Fair in February. Colonel Brown's invitation on behalf of the city was accepted, and the convention will be held during that month, although the precise date has not yet been determined.

After adjournment the Hardwaremen proceeded to the dock, where they boarded a steamer and were given a delightful and enjoyable four hours' sail as the guests of the Hardwaremen of Jacksonville, a sumptuous lunch being served en route.

Uniform Bill of Lading.

OWING to physical hindrances which have developed among shippers in providing themselves with the new uniform bill of lading forms, prescribed for use after November 1, it has been decided by the committee having charge of the matter to allow shippers to use their own forms in bills of lading, shipping receipts and dray tickets until December 31, provided all such forms are stamped as follows:

This shipment is tendered and received subject to the terms and conditions of the company's uniform bill of lading, effective November 1, 1908. This receipt is not negotiable, and if the shipment is consigned "to order" must be exchanged for the company's uniform order bill of lading.

.....
Shipper's signature. Agent's signature.

This does not waive the application of the terms of the contract after November 1, nor is it permitted to carriers to issue bills of lading on other than the new forms. The extension of time is solely to enable shippers to use their present forms subject to the terms and conditions of the new uniform bill of lading, until they can provide themselves with the authorized forms before January 1,

THE GEORGE P. CLARK COMPANY, Windsor Locks, Conn., manufacturer of Trucks and Casters, has just removed its New York office from the Postal Telegraph Building to Room 2338, Park Row Building.

Catalogue File of C. H. Curtiss & Co.

THE accompanying illustration shows the catalogue file used in the office of C. H. Curtiss & Co., Tarrytown, N. Y. The shelves are built up against the wall 10 to 12 in. apart, and are divided into compartments by vertical partition boards. The compartments so formed are numbered consecutively by 10s, thus making it possi-

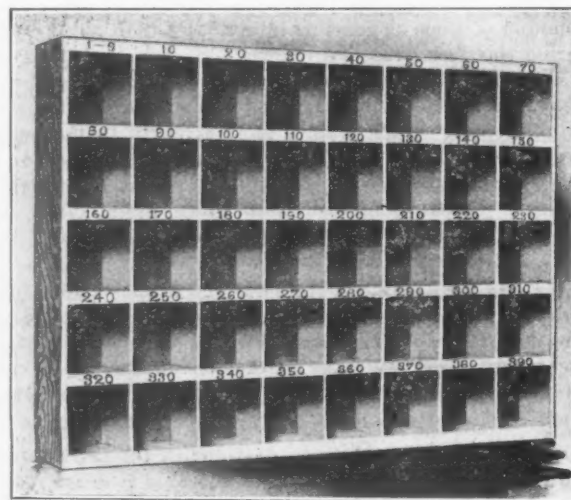


Fig. 1.—Catalogue File of C. H. Curtiss & Co.

ble to keep 10 catalogues in each compartment and give every book a different number, which will at the same time indicate the place in which it belongs. Thus catalogues 22 and 29 would be in the third compartment on the upper shelf. Numbers are plainly marked on the front of the catalogues, and also on the edges of the different shelves above the compartments, as indicated in the illustration.

The Index to the Catalogues

is an excellent one, consisting of two card indexes, which are kept in the same drawer. One index, Fig. 2, refers

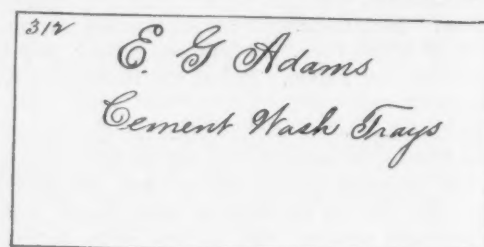


Fig. 2.—Card from Manufacturers' Index.

to manufacturers, the card, of course, mentioning their product and the number of their catalogue. The other index, Fig. 3, refers to lines of goods, and indicates the numbers of the catalogues referring to them. It would probably be an advantage to give the manufacturers' names beside the catalogue numbers on the goods index cards. If this were done, completing the cross reference considerable time and bother might be saved. Another

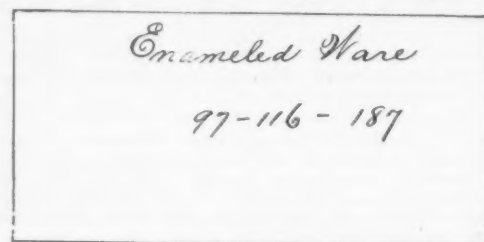


Fig. 3.—Card from Index of Goods.

possible improvement in the system would be to add addresses to cards in the manufacturers' index, which might frequently save looking it up elsewhere.

It should be added that the file illustrated is designed for small and moderate-sized books. Large, heavily bound catalogues are kept in separate shelves, where they can be quickly recognized from appearance or printed title without reference to the index.

Holiday Trade in the Hardware Store.

HARDWARE merchants throughout the country are now laying their plans and making preparations for the holiday trade. In view of the success which has attended intelligent efforts to push the sale of articles in Hardware and related lines which can very well be offered during the holiday season, it is not unlikely that the movement this year will be prosecuted with more enterprise and energy than ever before. During the next few weeks we will present some articles on the subject of the cultivation of Christmas holiday business, giving hints and suggestions which may be of value to the trade. In this connection we will also reproduce a number of window displays made by Hardware merchants which have been found effective in attracting attention to the store and the line of goods thus offered for sale.

Christmas Window of John M. Page & Co.

John M. Page & Co., Naugatuck, Conn., have a store front of about 75 ft., which is divided into four windows, each nearly 6 ft. deep. This excellent display space is made use of to good advantage. For the past 10 years

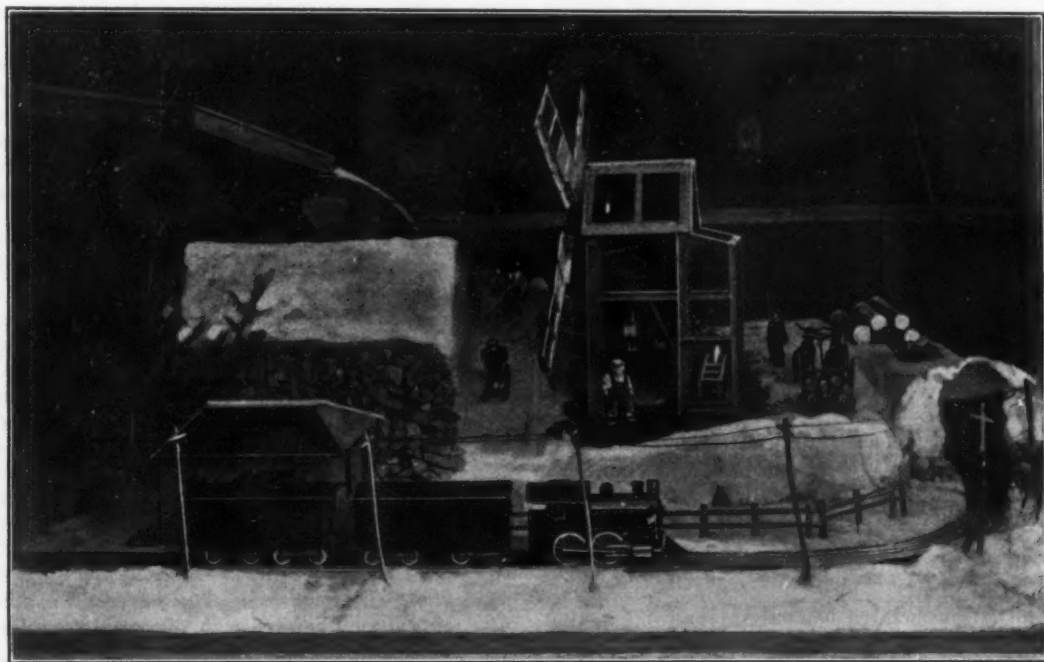
Sleds were made of their wood painted to resemble the real thing.

On the lower level at the foot of the hill and passing around on the back side was a moving electric train run by electricity from the lighting system of the store, with station, telegraph poles and wires, rail fence and other details. Broken stone, evergreens, &c., complete the picture, while the ground was covered with white cotton to represent snow.

The whole display was certainly very complete and attractive and calculated to rivet the attention of all observers, but especially the younger members of the community.

Hubbard & Co.'s Extensions.

EXTENSIVE additions to their plant have recently been completed by Hubbard & Co., Pittsburgh, manufacturers of Shovels, Railroad Tool Supplies, &c., which will about triple the production in Forgings, Hot Forged Bolts, &c., besides increasing the capacity for Pole Line Hardware, both galvanized and plain, which is a specialty with the company. The buildings are of steel and brick construction, the forge shop being 90 x 100 ft., finishing room, 75 x 90 ft.; warehouse, 62 x 100 ft., and machine shop, 35 x 80 ft. Contracts have been let for and deliveries are now being made on new equipment, including Acme Headers and Forging Machines, Threading Ma-



Mill Scene in Holiday Show Window of John M. Page & Co.'s Hardware Store.

the firm has used one of these windows during the Christmas season for a mechanical display. The other windows were fixed up with holiday goods and the results from the combination were excellent.

One of the firm's mechanical displays is reproduced herewith, its effectiveness being well suggested by the excellent photograph. In the rear of the window to the left of the picture is an overshot water wheel, which was made in the store and has done duty more than one season. It was about 3 ft. in diameter, and was fed from the city water supply, a waste pipe underneath carrying the water away. In the center of the window was an old country wind mill complete in every detail, with gristmill on the second floor and bolting machine on the first. The saw mill connected with the plant contained a Circular Saw run by power from the water mill, transmitted by a belt which also turned the arms of the windmill. At the right of the mill was a road leading up from below, on which may be seen an ox team and load of logs. The Sled was homemade, but the oxen were bought at a toy store. Between the mill and the water wheel was another road with children coasting. The children were dolls dressed by the firm's women friends and their

chines and Nut Tappers, large Punch and Shear, Bulldozer, some additional machine tools and a 200 hp. Miller Gas Engine. The company this week awarded a contract to the Dravo Contracting Company, Pittsburgh, for a new pumping station to be located below its plant on the Allegheny River. This building will be circular, 25 ft., and will furnish water for the entire plant, including gas engines, fire system, &c., and will have a filter bed affording a large supply of clear water. The station will contain two De Laval centrifugal pumps, one of which will be held in reserve for emergency purposes. Its pumping capacity will be 500,000 gallons of water in ten hours. In addition to the pumping apparatus, a new 75 hp. Miller gas engine and Western Electric Company's motors and generators will be installed. It is expected that the machinery will be set up and in operation by about December 15.

The Antlers Mercantile Company, Antlers, Okla., has been succeeded by the Finley Hardware Company, incorporated with a fully paid capital stock of \$8000, the officers being F. G. Speer, president; J. Mitchell Vick, vice-president; C. A. Finley, secretary and treasurer.

Washington Letter.

THE NATIONAL GRANGE AND DENATURED ALCOHOL.

WASHINGTON, November 3, 1908.

THE National Grange, Patrons of Husbandry, hold their national convention in this city, November 10 to 20. Among the subjects to which special attention will be given is denatured alcohol and its production and use throughout the country. There will be an exhibit, to which the public is invited, of utensils and appliances for the consumption of alcohol, including Stoves, Lamps and other larger and smaller articles.

German Alcohol Appliances.

Up to this time many of these articles have been imported, the best being those which have received the approval of the German national monopoly organized to promote the sale of alcohol and alcohol appliances throughout the German Empire, in consequence of which the annual consumption of industrial spirits in that country is now something like 70,000,000 gallons. In spite of an import tax of 45 per cent. ad valorem, increased to about 60 per cent. by freight charges, &c., imported appliances until quite recently were retailed at an advantage in price as compared with the products of American manufacturers. German producers have been making alcohol utilities for 10 or 15 years, and have long since outgrown the experimental stage, as the official monopoly, by requiring that all appliances handled by them must first undergo severe tests by their experts for a period of one year, has accomplished wonders in increasing the safety, economy and efficiency of German alcohol utilities.

American Devices on the Market

There are now six or eight different alcohol Stoves of American make on the market, several types of American Lamps, three American Alcohol Flatirons, many different domestic makes of Chafing Dishes, Hot Plates, &c. and other devices will be offered to the public as soon as the necessary dies for their production can be manufactured. All of these domestic products have the style and good appearance characteristic of American appliances, and while all of them are as well made, durable, safe, efficient and economical as the imported lines, most of them embrace improvements on their foreign models.

The Great Superiority of Denatured Alcohol Over Any Other Fuel for Household Purposes

has been fully demonstrated not only abroad but in this country since the free alcohol law went into force. Official tests have shown that because alcohol can be vaporized and burned in a mantle for lighting purposes, its entire efficiency thus being developed, it is cheaper than any petroleum product costing only one-third as much, to say nothing of superior cleanliness. The comparison with ordinary burning fluids for cooking purposes is not quite so advantageous to alcohol, but its superior safety is a factor that cannot be overlooked and that offsets the slightly greater cost. Denatured alcohol does not vaporize at ordinary temperatures and therefore cannot explode, while if it becomes ignited the flame may easily be extinguished by suffocation or by the addition of a relatively small amount of water, whereas the mixing of water with petroleum products simply serves to spread the conflagration. Denatured spirits stored in any quantity are looked upon with favor by the underwriters; insurance rates are therefore lower and no vexatious restrictions are imposed upon storerooms, warehouses, &c.

Exhibitors During Convention.

Exhibitors whose wares will be shown during the convention of the National Grange in this city will number a score or more, and will include the following:

ALCOHOL APPLIANCES BUREAU, Townsend Building, New York.—A line of high grade Alcohol Lamps and Fixtures.

MANNING, BOWMAN & CO., Meriden, Conn.—A complete line of Heating and Cooking Stoves for denatured alcohol, supplied

by a comprehensive assortment of Chafing Dishes and other alcohol burning appliances.

LANDERS, FRARY & CLARK, New Britain, Conn.—A line of alcohol Cooking Stoves.

G. COHN & CO., 334 Broadway, New York.—An extensive line of imported German alcohol Lamps and Heating and Cooking Stoves.

RAILWAY & STATIONARY REFRIGERATOR COMPANY.—A line of Refrigerators in which the freezing mixture is ethyl chloride manufactured with the use of specially denatured alcohol. These Refrigerators are of all sizes from those suitable for small private families up to installations large enough for refrigerator cars, steamships, &c. These devices supply dry air refrigeration and simultaneously produce substantial quantities of ice.

UNITED STATES INDUSTRIAL ALCOHOL COMPANY, New York City.—An exhibit of the various classes of packages in which Pyro denatured alcohol is distributed.

The exhibit will be in charge of several experts, who will give demonstrations of the various devices shown and all desired information regarding prices, deliveries, &c.

CATALOGUE HOUSES OPENLY DECLARE FOR PARCEL POST

A NEW and exceedingly interesting trend has been given to the campaign for the enactment of parcel post legislation, and especially to the effort now being made to secure the adoption of the Bristow-Meyer rural parcel post project. The leading mail order houses, which heretofore have pretended neutrality on the subject or have even declared themselves to be opposed to parcel post because of their superior system of distribution which would have to be abandoned, have now thrown off the mask and are not only openly advocating the Postmaster-General's measures, but are flooding the mails of Senators and Representatives with communications from their customers protesting against the present rate of postage on merchandise and urging the passage of the pending bills drafted in the Post Office Department.

The Change of Front of the Catalogue Houses.

The managers of the catalogue houses are undoubtedly shrewd men, and in modifying their public position with respect to parcel post legislation they have merely weighed carefully the pros and cons and have reached the conclusion that, while their advocacy of a parcel post may militate against the authorization of the project by Congress by justifying the contentions of the retail merchants that the catalogue concerns have always favored this legislation and would be its chief beneficiaries, yet, on the other hand the influence of their many thousand customers brought to bear upon Senators and Congressmen will overbalance any possible disadvantage resulting from their championship. The advocacy of the parcel post with special reference to the rural free delivery by the big mail order concerns is now unequivocal, as will be seen from the following extract from a letter addressed to a customer by a large Chicago catalogue house:

We wish to advise that we have always been in favor of the Parcel Post law, as there is no doubt whatever that this law would greatly affect our customers' interests as well as our own. There are a great number of small packages which we must ship by express on account of the weight that would be handled through the mail were this law in effect, and it would save our customers a great deal of inconvenience by having them call at the express station for their goods. Were this Parcel Post law enacted the rural free delivery would be put into use in delivering these packages. We sincerely hope to see the day when this law will be enacted and feel safe in saying that it is only a short time off.

Stereotyped Petitions for Support of Legislators.

The result of the change of front on the part of catalogue houses is seen in the letters and petitions—the latter on stereotyped forms, which are understood to have been inclosed in packages of merchandise shipped by the catalogue houses—which are being found by Senators and Representatives in their mail. The plan of campaign appears to have been worked out very systematically, for the distribution of these petitions has been so extensive as to reach not only members and Senators in the present Congress, but candidates for seats in the House who,

even if elected, will have no vote until December, 1909. It is apparent, therefore, that the mail order managers have taken a leaf out of the book of the retailers in their efforts to secure pledges concerning parcel post legislation not only from members of the present Congress but from those who may be chosen at the elections being held to-day throughout the country.

The Plans for the Coming Campaign

to secure the authorization of an experimental rural parcel post are rapidly taking shape, and the danger that menaces the retailer on this account is daily becoming more apparent. Friends of the project are even doing missionary work among the retailers and are soliciting support on two grounds, first, that if the Bristow-Meyer plan should be adopted by Congress it would put an end to agitation for a general parcel post; and, second, that, pending a thorough test of the practicability of a rural parcel post, Congress could not be induced to extend the system; while, should it not justify the claims made as to the benefits that would be derived by retail merchants, Congress would certainly refuse further appropriations for its support and the entire parcel post movement would come to an end.

Adoption of Rural Parcel Post Would Stimulate Demand for Further Legislation.

The readers of *The Iron Age* who have followed the developments of the past few years, especially in connection with the expansion of the rural free delivery service, do not need to be told that the adoption of a rural parcel post, so far from putting an end to legislation, would merely stimulate a demand from all parts of the country for a general parcel post. In fact, it is difficult to see how Congress could refuse such an extension, especially if the postal officials could make a respectable showing regarding the alleged success of the institution as applied to rural routes. As to the effect of the proposed experiment on rural routes, the Post Office Department is so fully committed to the project and would so completely control all official reports on the subject, that it goes without saying that the experiment would merely serve to redouble the present demand.

P. O. Department Would Ignore Economic Side of Question.

In this connection the fact must constantly be kept in mind that the Post Office Department views all postal innovations from a purely administrative standpoint, and gives little or no consideration to the important economic questions involved which appeal so strongly to retail merchants and other opponents of paternalistic legislation. It is not necessary to assume, therefore, that postal officials would be obliged deliberately to misrepresent the facts in order to present a basis for an extension of the rural parcel post experiments, for it is obvious that what might appear to be a success from an administrative standpoint would be an abject failure from the standpoint of an important class of injured citizens.

Conditions in Great Britain.

The efforts which the Post Office Department has been making through postal treaties to increase the apparent discrimination in the matter of postal rates between the domestic and the international service gives point to the results of an investigation of conditions in Great Britain recently made in the interest of the retail merchants of the Northwest by L. A. Fleming, Minneapolis, Minn. In describing his observations, Mr. Fleming among other things says:

American friends of so-called postal reforms point to the absence of express companies in the Kingdom of Great Britain as one of the good results that have been obtained, and say this is entirely due to the existing postal laws. But if there are no express companies in Great Britain, there are scores and hundreds of forwarding agents that perform the functions of our American express companies. The railroads are themselves engaged in the forwarding business, making low rates for service by fast express, exceeding in limit of weight and size of packages received by the limitations of the postal service by many pounds, even by hundreds of pounds.

Any attempt at comparison between carrying methods in Great Britain with those in vogue in the United States is useless because of the very short distances between points in the former.

I asked the managers of some of the leading stores in Ireland, Scotland and England if parcel post offered great opportunities for them to send business into the country, and without exception they admitted that the business by post was decreasing, while the express by rail and for forwarding agents looking for car lot assignments was increasing.

Eleven pound packages and under are but a small quantity of package shipments.

From the best information at hand, it is evident that the big carriers have nullified parcel post in Great Britain, and what they have left the railroads have picked up. These carriers receive all manner of parcels, put hundreds in baskets, and thus get the very lowest rates of transportation. They give their patrons lower rates than they could otherwise obtain and because of their concessions charge them 4 cents on each consignment, a "booking charge" which gives the carrier a very fair return for his kindness to the shipper. Little packages go by parcel post as a rule, and many of the larger department stores use the mails for delivering goods to out of town customers.

These low rates but add to the burdens of the merchant of the interior. The independent retailer in the country has few friends. Cheap rates, co-operative stores, chain stores, mail order houses by the thousand, fares paid entirely, special excursions with fares paid, and "tontine" establishments tend but to make the independent merchant, be he a grocer or "draper," as they call dry goods dealers, only a small potato of the kind that are many in the hill.

Our mutual friends, the English general merchant, the independent grocer and the small retailer have been almost completely relegated to a parsimonious living by co-operation, mail order retailing, the carriers or forwarding agent, and last but not least, by cheap excursions to cities.

That these same evils will, if they obtain a foothold in the United States, accomplish the same results for the American general merchant and retailer I firmly believe.

Average Number of Parcels Handled in Great Britain During Year 2.5 Per Capita.

When the fact is borne in mind that the catalogue house, as known and operated in the United States, does not exist in Great Britain, the force of Mr. Fleming's observations is materially increased. The latest official statistics, as shown by the annual report of the British Postmaster-General for the year ended March 31, 1908, disclosed the fact that, notwithstanding the success claimed for the domestic parcel post on every score except that of expense, the average number of parcels per capita handled during the year was only 2.5. If these figures show anything they indicate that a similar institution adopted in the United States would be of little or no value to the average taxpayer—and certainly would not compensate the farmer for the expense of installing package boxes—while the catalogue houses would receive an annual cash bonus aggregating millions of dollars.

F. E. Myers & Bro.

WE are advised by F. E. Myers & Bro., Ashland, Ohio, that they have reconstructed and re-equipped the entire brass department of their works, both foundry and machine shop. The foundry, which has been reconstructed along modern lines, with a view of producing Brass Castings of the highest quality, is in charge of an experienced foreman, possessing a thorough knowledge of metallurgy. The brass machine department, which has been placed on the third floor, in a large, well lighted room, has been equipped with new machinery throughout, including the most modern turret lathes fitted with automatic chucks, self-opening dies and special tools and jigs of every description, for the rapid and accurate production of all the brass parts required in the construction of Pumps. This department is also in the hands of a man who is an expert in his field, and who is thoroughly familiar with the production and manufacture of brass goods. A special department has been added for the manufacture of a superior line of Spray Nozzles. These Nozzles are made in considerable variety for every requirement and condition, and have been developed along the lines recommended by the experimental stations of the various States.

Dewane Brothers, Cooperstown, Wis., handling Hardware, Farm Machinery, Wagons, Buggies, Sleighs, &c., are erecting a new two-story and basement store building, 60 x 84 ft., at Maribel, Wis., for the accommodation of a branch store, which will be operated in connection with the Cooperstown business.

offensive fashion to close the book and leave the office. Mr. Clark and both the Hartmans were at lunch and this man was temporarily in charge of the office, so I beat a retreat with what grace I could muster, and asked Mr. Clark upon his return so to arrange matters that I could get the information I needed.

Snobbishness Hard to Endure.

Of all the things which are hard to bear by a youngster in an organization, snobbery or abuse of authority on the part of those just above him is the worst. If this large bodied, small spirited slave of a ruling pen and balance sheet had spoken to me quietly I should have been content to let the matter rest until Mr. Clark's return with no thought of offense, but he bawled at me from a distance of 3 ft. a peremptory demand to "shut up that book and get out of here," with a very evident intent to create an impression upon every one within hearing. It was a little thing—too small for comment ordinarily—but it is one of the incidents that is most vivid in my recollection of that time, marking the only discourtesy I ever experienced while in Hartman Brothers' employ. It perhaps served a useful purpose, for I then resolved never to offend in like manner, and I do not think I ever have done so. I have since had dealings with thousands of associates in the large corporations which have employed me, and have had hundreds in my own departments, but never to my knowledge have I made any undue exercise of authority or willfully hurt the feelings of another, and I have learned to be especially considerate of those in subordinate positions.

The Thing That Counts.

I had an interesting conversation a few days ago with the vice-president of one of the largest concerns in the world—a man of large experience and honored by all who know him. "Masters," said he, "there is only one thing that really counts with me in this game of business. Men and matters come and go. Every deal and every detail is finished and disappears, to be replaced by others. The only one thing that remains is the sense of satisfaction I have when I consider that I have always given every man his just due and have done good to others when I had opportunity."

But this is a long digression from the subject in hand.

(To be continued.)

HARDWARE FREIGHTS.

The Origin and Effect of the Interstate Commerce Law.

BEFORE the Interstate Commerce law was enacted, in 1887, there was nothing to make it the legal duty of a railroad to charge all shippers the same rates. Under the common law a common carrier might charge one shipper a higher rate than another for the same identical service, and it was not necessary to publish tariffs nor to enforce them if published. The railroads all had their books of printed tariffs which were followed on "local" shipments, but on all business which amounted to anything in the way of tonnage the actual rates were fixed privately by contract between the traffic officials and the shipper. Even where an industry was located on one road and had no advantages of competition between two or more roads it could get inside rates, because every railroad was anxious to build up industries on its own line, and would meet in favor of its industries any concessions offered to competitors on other railroads.

Making Rates in the Dark.

The public did not like this method of making rates in the dark. Investigation showed that a few large corporations had been thrifty enough to collect rebates on shipments made by their smaller competitors, and while there were only a few notorious cases of this kind the demand for national legislation to regulate railroads became overwhelming and Congress was forced to act. As a matter of fact the railroads were usually fair under

the old system. They did not build up one industry with rebates at the expense of its competitors as a general practice. Whatever rates they made on a commodity were generally open to all the shippers of that commodity, and there were few cases where an industry suffered from discrimination.

In the Case of Petroleum

a few of the pioneer shippers joined together and helped the railroads to maintain rates that would be profitable to the carriers. The "pioneers" divided their business so as to give each road its agreed share of the tonnage of petroleum, which made the business profitable for the carriers and saved them from the necessity of cutting each other's throats to get the traffic. This was the master secret of the men who built up the Standard Oil trust. There were very few shippers in other lines who succeeded in getting this plan into operation. The average manufacturer was satisfied if he could get rebates on his own business that would keep him on all fours with his competitors.

The Reagan Bill.

The people, by instinct or reason, had the right idea in demanding legislation that would keep all shippers on an equal basis, but it may be open to question whether the law that was finally enacted was the best method of attaining the right. The original Reagan bill, introduced in Congress in 1884 by Judge Reagan of Texas, did not provide for any commission nor for any regulation of rates by national authority. It was merely intended to cover the defect in the common law by prohibiting the railroad from charging one shipper more or less than another. It provided a simple legal preceeding by which a shipper who had any suspicions could find out just what his competitors were paying by bringing the railroad officials into court and making them "fess up." This bill if it had become a law would have promoted competition between the railroads.

Bill Would Have Gone to the Root of the Evil.

Statesmen, whether they serve as courtiers in an empire or legislators in a republic, seldom neglect opportunities to increase their power over the affairs of the people. Too many of them are impressed with the idea that legislation or imperial grace is the great source of the material prosperity of the people and that the affairs of commerce should be regulated by the personal will of some august representative of government. The Reagan bill would have gone to the root of the evil of which the people complained, but it was "too easy" and simple, and, besides, it would promote competition among railroads in carrying the traffic of the country, and this was not satisfactory to the railroad attorneys, who constituted a majority of Congress in those times.

The Law as Finally Enacted in 1887

provided for a national Interstate Commerce Commission, whose members would embody the grace of a great and beneficent government in redressing the wrongs of the people. All tariffs must be filed with this commission, and when filed they became legal rates which must be enforced. The commission was given no power excepting to "hen around" and investigate, and incidentally to prosecute any railroad which did not observe its published rates. For nearly 20 years the law was a fraud against the rights of the shippers of the country. The "list prices," or paper tariffs, of the period before the law was enacted became in the course of time, through the application of the law, the actual rates which shippers were required to pay, and a subsequent amendment made it a crime for any shipper to seduce a railroad official into accepting less than the published rates.

An Unwritten Portion of the Law

authorized competing railroads to meet and agree upon the tariffs which they were to file with the commission, while the written law forbid any changes in the rates so agreed upon without filing new tariffs at Washington which would give three days' notice of any reduction and ten days' notice of any advance. The present law requires any change in rates to be filed 30 days before becoming effective.

Good Features in the Original Law.

There were, of course, some good features in the original law, such as the long and short haul clause and the prohibition of money pools, and the Hepburn law has corrected many of the one-sided provisions of the original act. The mischief of erecting paper tariffs into legal rates was accomplished years ago, and it would be fruitless now to lament the wrong that was done to shippers. Any changes in rates which are made in the future can be challenged before the commission, so that the shipper now has a fair opportunity to protect his interests.

It is evident, however, from the history of this particular legislation, that business men should consider carefully before they indorse popular schemes for the regulation of commerce by the Government. There is no effective way to regulate the Government and see that it does its work of regulation in the proper manner. The safest legislation is of the old direct form, which simply prescribes rules of conduct without clothing officials with any power to manage or direct the affairs of commerce or of the people.

Application of the Hepburn Law.

This is well illustrated in the application of the Hepburn law. The simple direct features of the law, which merely define what is right and what is wrong, are easily enforced through the judicial power of the commission and have proved very satisfactory. In numerous cases since the passage of the law where the commission has essayed to "manage" or direct railroad business through the medium of administrative rulings or orders the results have been disappointing, to put it mildly. A long list of these general orders might be cited which have created confusion and injustice to the shippers of the country.

Judicial Power.

The Hepburn law, however, has given to the commission a judicial power that was greatly needed to protect shippers against specific instances of injustice, and the commission, composed in the main of men learned in the law and possessing high qualifications for judicial duty, has given general satisfaction in its decisions in the cases that have been tried before it. In no instance have shippers appealed from these decisions to the courts, although in several cases the railroads have taken appeals.

As a judicial tribunal the commission has a great future before it, because a large number of the complaints filed can be disposed of without formal proceedings, and the important cases which require "formal" hearings are duly considered by members of the commission who have had vastly greater experience in handling these intricate traffic questions than any judge on the bench. A court could only declare that a rate was "unreasonable," and then leave the parties to the case in the air, because courts cannot prescribe what rates shall be charged; but Congress has given the commission the additional power to go on and fix a reasonable rate.

Before the Hepburn Law Was Enacted

the commission had very little power in traffic matters, excepting to agitate the "rebate" question and thus assist the railroads in erecting their "list prices" into legal rates, but the Hepburn act has given the commission broad powers which make it second only to the Supreme Court as a national tribunal.

Smallest Shipper Can Obtain Prompt Attention.

A citizen must have a large purse for costs and legal expenses and must wait with patience for several years if he would get the attention of the Supreme Court to any wrong that he has suffered; but the smallest shipper can obtain prompt attention of the Interstate Commerce Commission without costs or legal expense if he has suffered any wrong forbidden by the law or has been charged an excessive or unreasonable rate. As a national bureau to manage the railroads the commission has proved a failure, but as a court to hear grievances and do justice in thousands of specific cases it has proved itself the most businesslike and capable tribunal in the world.

Price-Lists, Circulars, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

D. W. BOSLEY COMPANY, Fulton and May streets, Chicago, Ill.: Catalogue 1908-1909 devoted to Weather Strips made of rubber and felt; also rubber, window, bar and counter cleaners and floor scrubbers, &c.

GERSTENDORFER BROS., 231-235 East Forty-second street, New York: Catalogue of decorative specialties under the registered trademark Sapolin. These include Enamels, Stains, Gold Paints, Polishes, Carriage Colors, &c.

MANDT WAGON COMPANY, Stoughton, Wis., branch of Moline Plow Company: Catalogue showing Farm Wagons and Repairs, Bob Sleds, &c.

DILLINGHAM MFG. COMPANY, Sheboygan, Wis.: Catalogues illustrating new Iceberg hardwood Refrigerators, Ice Chests, Grocers' Wooden Ware, Medicine Cabinets, Spice Cabinets, Commodes, Blacking Cases, Clock Shelves, Folding Tables, Lap Boards, Kitchen Cupboards, Step-ladders, Ironing Boards, Wash Benches, &c.

J. W. QUILLING MFG. COMPANY, Quincy, Ill.: Leaflet illustrating the Faultless Carpet Stretcher and Tacker, with directions for laying carpet. Also a combination Tack Puller, Corkscrew and Can Opener.

WARREN AXE & TOOL COMPANY, Warren, Pa.: Catalogue relating to Axes, Peavies, Cant and Mill Hooks, Timber Carriers or Lug Hooks, Pike Poles, Pickaroons, Bark and Cedar Spuds, Swamp and Loading Hooks, Grapple Hooks, Skidding Tongs, Rafting and Chain Dogs, Toe Rings, &c.

S. L. ALLEN & Co., Philadelphia, Pa.: Illustrated booklet devoted to Flexible Flyer Sleds, which are shown in a variety of sizes.

KEYSTONE MFG. COMPANY, Buffalo, N. Y.: Descriptive illustrated catalogue of Mechanics' Tools, including Ratchets, Socket Wrenches, Tap Wrenches and Stud Drivers, Westcott Adjustable S Wrenches, Taper Sleeves, Steel Sockets, Drilling Posts, Nail Sets, &c.

MEHLBACH SADDLE COMPANY, 106 Chambers street, New York: Equestrian outfits, including the Whitman and other Saddles, Bridles, Bits, Snaps, Stirrups, Spurs, Leggings, Riding Whips and Crops, &c.

CARNAHAN STAMPING & ENAMELING COMPANY, Canton, Ohio: Illustrated catalogue and price list of French Gray Enameled Ware.

ABBEY & IMBRIE, 18 Vesey street, New York: Wholesale catalogue No. 175, relating to Fishing Tackle, including Hooks, Lines, Flies, Sinkers, Rods, Rod Mountings, Reels, Spoons, Bait, Minnows, &c.

MANNING, BOWMAN & Co., Meriden, Conn., and 25 West Broadway, New York: Twelve page booklet, illustrating and describing Gas Stoves, Chafing Dishes, Meteor Circulating Coffee Percolators, Tea Kettles, Tea Pots, Toasters, Sauce Pans, Travelers' Companions, Cutlet Dishes, all used in connection with denatured alcohol.

In the article in our last issue on the new Hardware district in New York City, Fox Bros. & Co. were omitted in the enumeration given of houses in Hardware and allied lines embraced in this section. This firm has been located at 126, 128, 130 Lafayette street for the past three years, and was thus a pioneer in the movement. As manufacturers and manufacturers' agents they handle Railroad, Machine Shop, Mining and Contracting Supplies, Saw Mill Machinery, Sugar Plantation Equipment, Lumbering Supplies and Mining, Woodworking and Metal Working Machinery, with factories at Peekskill, N. Y., Woodbine, N. J., and Indiana, Pa.

G. J. Vayhinger has purchased the Hardware business of Phillips Bros., in Montesano, Wash.

The O. I. C. Pendulum Washing Machine.

The O. I. C. pendulum washing machine manufactured by the H. F. Brammer Mfg. Company, Davenport, Iowa, has a wooden lever handle to which is attached a rod on the lower end of which is a ball, the rod and ball forming the pendulum. The machine is operated by another rod held in the hand, which can be attached to the ball, as most convenient when sitting, or to the hook near the top of the lever handle when standing. It is pointed out that the pendulum attachment greatly reduces the labor of washing the clothes, as the work is all performed by a swinging movement of the arm.

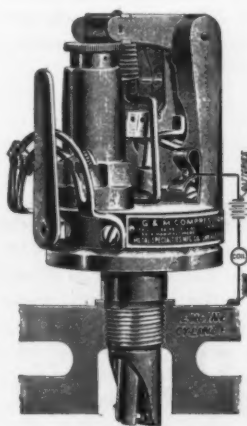
The Des Moines Elaterite.

A water proofing and bonding material made by the Elaterite Paint & Mfg. Company, Des Moines, Iowa, and known as No. 60 Des Moines elaterite, is described in a booklet devoted to the subject as an intensely adhesive, nonporous, acid resisting and absolutely waterproof pure carbon. The effectiveness of elaterite as a waterproof coating and a bonding material is ascribed to its adhesive quality and its elastic character, it is claimed, prevents cracking or checking under the extremes of contraction and expansion due to weather conditions. It is claimed that the plaster coat can be directly applied either on the inside of exposed walls or on outside walls treated with elaterite without furring or lathing. Its use on foundations is especially recommended for its water proofing effect, and for the same purpose it is applied to the back of marble or stone facing walls or window and door sills. Because of its extreme elasticity it is said to have great covering capacity, one gallon being sufficient to cover from 125 to 200 sq. ft. one coat, or 80 to 100 sq. ft. two coats on cement, brick or stone surfaces, depending, of course, upon the porosity of the surface. When used on wood or metal its covering capacity is largely increased.

The G and M Compression Igniter.

A self-contained igniter described as suitable for all kinds of internal combustion engines made by the Metal

Specialties Mfg. Company, 18-30 West Randolph street, Chicago, is here illustrated. The igniter is a make and break device, operated by gas under compression in the engine cylinder, which acts upon and raises a small piston contained in the igniter. The passage in the igniter, through which the compression is carried from the engine to igniter cylinder, is applied with a valve, which may be set to either advance or retard the time of ignition, so that it may be controlled with accuracy. There is no mechanical connection with any moving part of the engine, and since the electrical circuit is not made or broken at any other



The G. & M. Compression Igniter.

place than at the contact points within the cylinder the danger from fire caused by internal sparks is eliminated. The igniter is simple in its mechanism and operation, and is so designed that it can be screwed in place of the side tube, mechanical make and break, or jump spark plug, and can also be instantly adjusted to suit the compression of any engine. The superior results of the hammer make and break contact here employed are said to be easier starting, greater power, steadier running, no misfires and less straining and jerking of the engine. The time during which the points remain closed may be regulated at will. In case of neglect to open the switch in stopping the engine, no drain of the batteries will occur, as it is said to be impossible for the igniter points to re-

main in contact, regardless of where and how the engine may be stopped. When necessary the contact points may be readily replaced, and all parts are made interchangeable. All moving parts are made of tool steel and properly tempered.

The Yost Improved No. 1 Wood Workers' and Pattern Makers' Vise.

The G. M. Yost Mfg. Company, Meadville, Pa., is offering the vise shown in the accompanying illustrations. In its construction no stop pins or springs are used. The hub is cast solid on the back jaw, and a sleeve fits



Fig. 1.—The Yost Improved No. 1 Woodworkers' and Patternmakers' Vise.

over it which locks the vise positively in any position required, so that there can be no shake or lost motion. The nut is made of malleable iron and the hinge or plate for fastening to the bench is so constructed that it is unnecessary to cut away any part of the bench in mounting the vise. The jaws are 8 in. wide by 16 in. long,

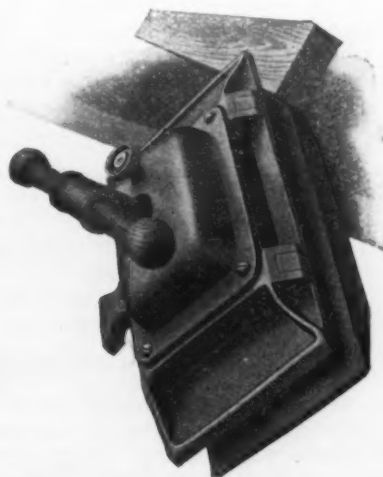


Fig. 2.—One of the Different Positions in Which the Yost Vise Can Be Used.

while the depth from the face of the jaw to the top of beam is $3\frac{1}{2}$ in. The device for adjusting the front jaw to a taper is referred to as being simple and durable. The rack bar for holding the vise in a vertical position is held by friction. In Fig. 2 one of the different positions in which the vise can be used is shown.

W. E. Rife, formerly interested in the Blue Valley Mercantile Company, Beatrice, Neb., has purchased the Richards Hardware Company's stock and business at Edgar, Neb. Mr. Richards, former owner of this business, expects to re-engage in the Hardware business, and is seeking a suitable location for the establishment of a Hardware store.

The Sterling No-Rivet Damper Clip.

A convenient and easily applied damper clip is a new specialty offered by Meister & Cochran, Sterling, Ill. It is designed for attachment to circular damper plates without rivets. Fig. 1 represents the handle clip, and the manner of attachment of it and the tail piece to the damper



Fig. 1.

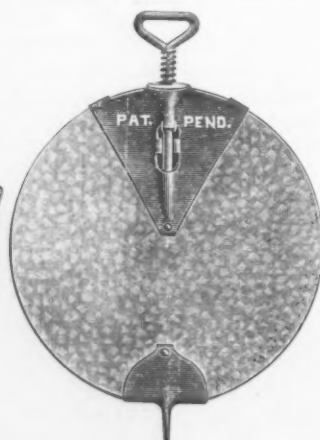


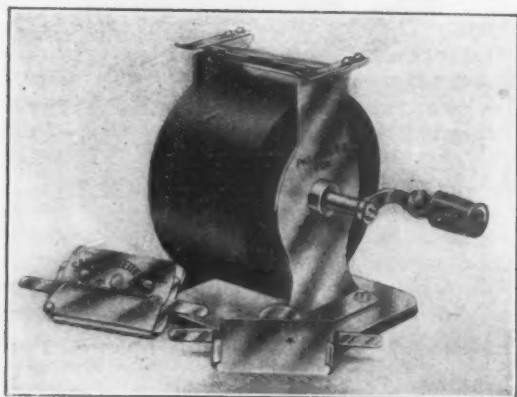
Fig. 2.

The Sterling No-Rivet Damper Clip.

is shown in Fig. 2. It is held in place by shoulder lugs, which clamp the rim of the damper, and is secured at the point by a right angle bend, which pierces the plate and is clinched on the opposite side. When fitted to circles over 10 in. in diameter the edge of the damper is clipped off, so that the shoulder comes flush with the place. The tail pieces are fastened in the same manner as the clip.

Rotary Safety Razor Strop.

The rotary stropper here illustrated, is designed to strop or sharpen any safety razor blade that has become dull or blunted by usage. It is composed of two upright steel side plates, which carry a cylinder mounted on a shaft and revolved by a crank on one side. The cylinder is covered with the best quality of razor strop. The tops of the side plates are fitted to receive a holder in which the blade is fastened, and by pressing the blade down on the cylinder it will lie in the proper angle to take an

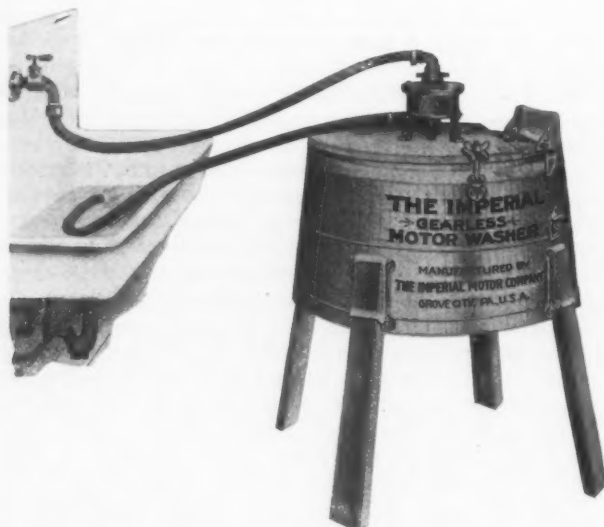


The Rotary Safety Razor Strop.

edge from the stropper as the cylinder is revolved. Both sides of the blade can be stropped, and the holder is so arranged that the blade can easily be removed and reversed. As soon as pressure on the blade is relaxed two springs act on the lateral extensions of the holder, raising the blade and preventing the strop being cut. The stropper is simply constructed and is said to do effective work. All of the attachments, as well as the stropper itself, are nickel plated and of neat appearance. The device is manufactured by Werner & Co., 203 South Canal street, Chicago.

The Imperial Gearless Motor Washer.

The washing machine shown herewith is being introduced by the Imperial Motor Company, Grove City, Pa. The tub is of the best quality, corrugated on the inside like a washboard. The motor is gearless, having no cogs, pulleys, belts or piston rack. It has a single shaft, is direct connected, with no lost motion or friction, and it is stated will carry an exceptionally heavy load under the dasher. It is stated that the cost of meter service is from 3 to 6 cents for water, to do the average washing, but that this nominal expense is more than counterbalanced in the saving of gas or fuel, as only half the time is required to do the work. All working parts are standard, renewable and interchangeable, and worn parts can



The Imperial Gearless Motor Washer.

be replaced by any one with ordinary intelligence. The clothes are not boiled, but are cleansed by agitation and suction, the motor turning the dasher more than 60 times a minute in boiling suds. The equipment is complete, including motor, tub and full set of hose, ready to attach to the kitchen faucet. The company guarantees the motor for a period of one year, against defective material or workmanship, and makes the assertion that with proper care and usage it will last indefinitely.

The Enterprise Electric Meat Chopper No. 820.

The accompanying illustration represents an electric meat chopper put on the market by the Enterprise Mfg. Company, of Pa., Philadelphia, Pa. The chopper is direct connected with the shaft of the motor, thus dispensing

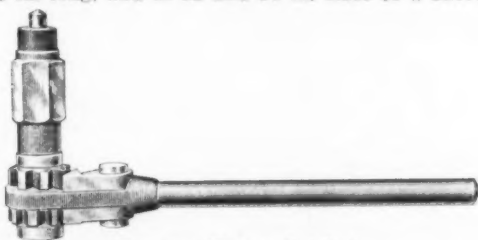


The Enterprise Electric Meat Chopper No. 820.

with the use of gears, and the capacity is larger than that of the company's belted machines. It is operated by means of a snap switch which saves much time. The chopper is detachable, so that it can be placed in ice chest if desired.

Keystone Weston Ratchet.

The Keystone Mfg. Company, Buffalo, N. Y., has added to its line the ratchet shown herewith. This is referred to as being similar to the well-known English "Weston" ratchet, although representing some improvements upon it. The tool illustrated is designed for rough and heavy work of all kinds, including railroad, structural, bridge, &c. It is made in the long feed type shown in the illustration, in four sizes, with handles 12, 14, 16 and 18 in. long, and in 12 and 14 in. sizes of a short feed

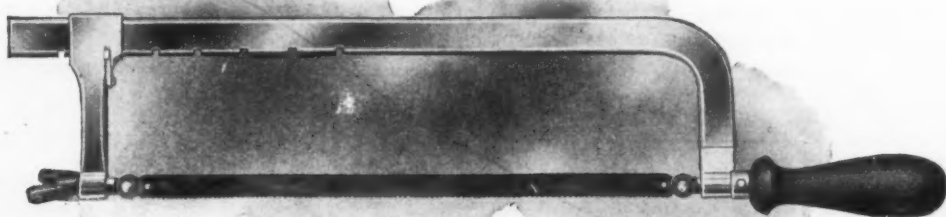


Keystone Weston Ratchet.

for boilermaker's use, for square shank drills only. The company remarks that the tools are of superior workmanship and finish.

The Universal Hack Saw Frame No. 1908.

The West Haven Mfg. Company, New Haven, Conn., is offering the improved hack saw frame shown herewith. It is alluded to as being extra strong and light in weight. It takes regular length blades, from 6 to 12 in., and will work equally well with any one of the different sizes. The frame is made of fine quality crucible steel $\frac{3}{4}$ x 3-16 in., and is highly nickel plated, as is also the slide. The blade is held in place by a knurled nut, so as to prevent it falling when the strain is relieved for the purpose of adjustment. The accuracy of graduation for the placing of the slide for the different lengths of blades is referred to as an important feature. The spaces are all marked for the different lengths, so there is no guesswork as to where to place the slide for any length of blade, thus making adjustments rapid. The slide is held in place at any desired point by a latch re-



The Universal Hack Saw Frame No. 1908.

volving on a screw, one end of which fastens in the graduation slot of the frame stock. The distance from the bottom of the frame to the tooth edge of the saw is $3\frac{1}{8}$ in. The handle is $1\frac{1}{2}$ in. in diameter and $4\frac{1}{2}$ in. long, and the blade is easily turned to cut in four positions without removal from the frame.

The Elmore Square Shank Screwdriver.

The Elmore Tool Mfg. Company, Hartford, Conn., has designed the screwdriver shown herewith especially intended for machinists's use. The entire blade, shank



The Elmore Square Shank Screwdriver.

and head of the tool are forged from square steel bars, which permits the use of a wrench in loosening cap and other large screws. The line includes various sizes, all fitted with serviceable black rubberoid handles.

The North Wales Door Holder.

The new style door holder shown herewith, is being placed on the market by the North Wales Machine Company, Inc., North Wales, Pa. Patents have been applied for. The holder is small and neat in appearance and aside from the necessary tension springs and rubber

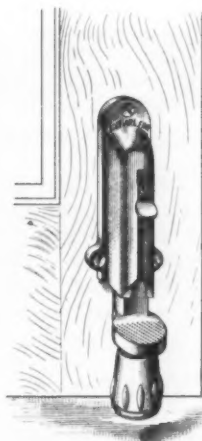


Fig. 1.—The North Wales Door Holder.

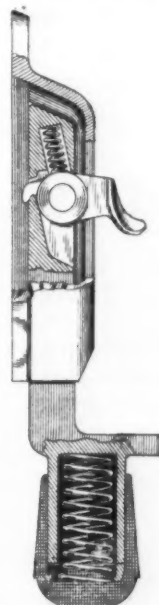


Fig. 2.—Construction of Door Holder.

cap, consists of but three parts, the casing, slide and operating catch. Fig. 2 shows the action of the various parts, that of the catch being in the nature of a roller between the inclined surface of the slide and inside of the casing, permitting the slide to be readily pushed downward by the operator's foot, but positively preventing any return motion until the operating catch is released, which can be done by a slight upward pressure

of the foot under the catch. As there is a free downward movement, the firmness with which the door is held at any position is dependent entirely on the pressure exerted by the operator. There are no pawls or ratchets connected with the operating of the device, and the springs play no part in the actual operation, the catch spring simply holding the catch in a locked position until released, while the foot spring enables the rubber socket to get a firm hold on the floor when the necessary pressure is applied. The rubber socket is of the usual standard type, and being cushioned by the tension spring, will wear for a long time before replacing. The

device when in use is fastened in an upright position at the base of the door. It is made of iron, finished in antique bronze, and measures about 8 in. over all. A smaller size will also be made in bronze.

B. & S. All Steel Screwdriver.

The Billings & Spencer Company, Hartford, Conn., has added to its product a new and improved line of all steel screwdrivers, two of which are shown herewith. Fig. 1 represents the regular model and Fig. 2 an extra heavy style with square shank for the application of a wrench. The tools are made of drop forged steel



Fig. 1.—B. & S. All Steel Screwdriver, Regular Model.



Fig. 2.—B. & S. Screwdriver, Heavy Model with Square Shank.

throughout with points carefully tempered, and are complete in one piece. The handles are of special design, insuring an easy and positive grip, with nothing to loosen or get out of order. The screwdrivers are described as light, effective and durable. They are listed in 11 sizes, including two of the heavier model with square shank.

The Enterprise Tent Cot.

A very compact tent-cot designed for the convenience of invalids, campers, or others sleeping out of doors is



The Enterprise Tent Cot.

shown in the accompanying illustration, the weight of which does not exceed 30 lb., and is therefore easily port-

able. It is made by the Enterprise Bed Company, Hammond, Ind. The cot frame is of hard maple painted green, and is covered with 10-ounce brown duck, while 8-ounce duck of the same color is used for the canopy or tent. The openings at the side and ends are provided with adjustable flaps, which may be raised or lowered by the occupant from within. The openings are protected from the intrusion of insects by strong mosquito netting. The canvas sides, tops and ends are collapsible, and fold

down closely within the frame, as shown. The tent-cot is entirely self-contained, and is described as being impervious to rain or sun, and at the same time ample provision is made for ventilation. There are no detached parts which might be misplaced, even the mosquito netting under the big side curtain being permanently fastened in place, so that it can be operated independently or rolled up and down with the curtain as desired.

The Sun Mfg. Company's Show Cases.

The Sun Mfg. Company, Columbus, Ohio, is making a line of counter showcases and display cases in various sizes and styles, golden oak finish, adapted to general merchandise; also special cases for different lines of goods. Some of the cases are shipped knocked down, resulting in a saving of freight. The company also manufactures prescription cases and counters, cashiers' desks, combination showcases and money drawers, &c. In a recent catalogue issued by the company most of the illustrations are made from photographs, showing the cases exactly as they look when in use.

The Hardware store and business of J. T. Moore, Monticello, Ind., has been purchased by Dye & Gardner. Mr. Gardner will have full charge and management of the business.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—		per gal	China Clay, Imported. per ton		11.50@18.00	per gal	Blue, Ultramarine.....		13 @14	Black Drop, English.....		5 @15
table Oils—		per gal	Cobalt, Oxide.....		per 100 lb 1.45@ 2.60	per gal	Brown, Vandyke.....		11 @14	Black, Ivory.....		16 @20
Linseed, Western, Raw.....	41 @..	bbls.	Whiting, Commercial..... <td>per 100 lb 42@52</td> <td>per gal<td colspan="2">Green, Chrome.....<td>12 @16</td><td colspan="2">Lamp, commercial.....</td><td>4 @ 6</td></td></td>		per 100 lb 42@52	per gal <td colspan="2">Green, Chrome.....<td>12 @16</td><td colspan="2">Lamp, commercial.....</td><td>4 @ 6</td></td>	Green, Chrome..... <td>12 @16</td> <td colspan="2">Lamp, commercial.....</td> <td>4 @ 6</td>		12 @16	Lamp, commercial.....		4 @ 6
State, Raw.....	42 @..	..	Gilders..... <td>per 100 lb .55@ .60</td> <td>per gal<td colspan="2">Green, Paris.....</td><td>24 @</td><td colspan="2">Blue, Chinese.....<td>30 @32</td></td></td>		per 100 lb .55@ .60	per gal <td colspan="2">Green, Paris.....</td> <td>24 @</td> <td colspan="2">Blue, Chinese.....<td>30 @32</td></td>	Green, Paris.....		24 @	Blue, Chinese..... <td>30 @32</td>		30 @32
City, Raw.....	42 @43	..	Ex. Gilders..... <td>per 100 lb .60@ .65</td> <td>per gal<td colspan="2">Sienna, Raw.....</td><td>12 @15</td><td colspan="2">Blue, Prussian.....</td><td>28 @30</td></td>		per 100 lb .60@ .65	per gal <td colspan="2">Sienna, Raw.....</td> <td>12 @15</td> <td colspan="2">Blue, Prussian.....</td> <td>28 @30</td>	Sienna, Raw.....		12 @15	Blue, Prussian.....		28 @30
Boiled, 1¢ per gal. advance on Raw.		..				per gal <td colspan="2">Sienna, Burnt.....</td> <td>12 @15</td> <td colspan="2">Blue, Ultramarine.....<td>3 1/2 @15</td></td>	Sienna, Burnt.....		12 @15	Blue, Ultramarine..... <td>3 1/2 @15</td>		3 1/2 @15
Raw, Calcutta, in bbls.....	70 @..	..				per gal <td colspan="2">Umber, Raw.....</td> <td>11 @14</td> <td colspan="2">Brown, Spanish.....</td> <td>1 1/2 @ 1</td>	Umber, Raw.....		11 @14	Brown, Spanish.....		1 1/2 @ 1
Lard, Prime, Winter.....	74 @78	..				per gal <td colspan="2">Umber, Burnt.....</td> <td>11 @14</td> <td colspan="2">Carmine, No. 40.....</td> <td>\$3 10@3.25</td>	Umber, Burnt.....		11 @14	Carmine, No. 40.....		\$3 10@3.25
Extra No. 1.....	51 @52	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Green, Chrome, ordinary.....</td> <td>3 1/2 @ 5</td>				Green, Chrome, ordinary.....		3 1/2 @ 5
No. 1.....	49 @50	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Green, Chrome, pure.....</td> <td>17 @25</td>				Green, Chrome, pure.....		17 @25
Cotton-seed, Crude, f.o.b. mill.....	28 @29	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Other, American.....</td> <td>per ton \$8.50@16.00</td>				Other, American.....		per ton \$8.50@16.00
Summer Yellow, prime.....	36 1/2 @37	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">American Golden.....</td> <td>2 1/2 @ 3 1/4</td>				American Golden.....		2 1/2 @ 3 1/4
Summer, White.....	40 1/2 @41	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">French.....</td> <td>1 1/2 @ 2</td>				French.....		1 1/2 @ 2
Yellow Winter.....	43 @45	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Foreign Golden.....</td> <td>3 @ 4</td>				Foreign Golden.....		3 @ 4
Tallow, Acidless.....	50 @50	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Orange Mineral, English.....</td> <td>10 @12</td>				Orange Mineral, English.....		10 @12
Menhaden, Brown, Strained.....	35 @36	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">French.....</td> <td>12 1/2 @13</td>				French.....		12 1/2 @13
Northern Crude.....	27 @30	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">German.....</td> <td>12 @13</td>				German.....		12 @13
Southern.....	23 1/2 @24	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">American.....</td> <td>9 @10</td>				American.....		9 @10
Light Strained.....	35 @36	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Red, Indian, English.....</td> <td>4 1/2 @ 6</td>				Red, Indian, English.....		4 1/2 @ 6
Bleached Winter.....	37 @39	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">American.....</td> <td>3 @ 3 1/4</td>				American.....		3 @ 3 1/4
Ex. Bleached Winter.....	39 @41	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Red, Turkey, English.....</td> <td>4 @10</td>				Red, Turkey, English.....		4 @10
Cocoonut, Ceylon.....	6 1/2 @ 6 3/4	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Red, Tuscan, English.....</td> <td>7 @10</td>				Red, Tuscan, English.....		7 @10
Cochin.....	7 1/4 @ 7 1/2	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Red, Venetian, Amer.....</td> <td>100 lb \$0.50@1.25</td>				Red, Venetian, Amer.....		100 lb \$0.50@1.25
Cod, Domestic, Prime.....	36 @40	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">English.....</td> <td>per 100 lb \$1.15@1.60</td>				English.....		per 100 lb \$1.15@1.60
Newfoundland.....	40 @42	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Sienna, Italian, Burnt and</td> <td></td>				Sienna, Italian, Burnt and		
Red, Elaine.....	40 @42	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Powdered.....</td> <td>3 @ 9</td>				Powdered.....		3 @ 9
Saponified.....	5 1/2 @ 5 3/4	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Italian, Raw, Powdered.....</td> <td>3 @ 7</td>				Italian, Raw, Powdered.....		3 @ 7
Olive, Yellow.....	\$1.15@ \$1.25	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">American, Raw.....</td> <td>1 1/2 @ 2</td>				American, Raw.....		1 1/2 @ 2
Neatsfoot, Prime.....	55 @58	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">American Burnt and Pow'd.....</td> <td>1 1/2 @ 2</td>				American Burnt and Pow'd.....		1 1/2 @ 2
Palm, Lagos.....	7 1/2 @ 8 1/4	..				per gal <td colspan="2"></td> <td></td> <td colspan="2">Talc, French.....</td> <td>per ton \$18.00@25.00</td>				Talc, French.....		per ton \$18.00@25.00
						per gal <td colspan="2"></td> <td></td> <td colspan="2">American.....</td> <td>per ton 15.00@25.00</td>				American.....		per ton 15.00@25.00
Mineral Oils—		per gal.				per gal				Terra Alba, French.....		per 100 lb .90@ 1.00
Black, 29 gravity, 25@30 cold test.....	13 @13 1/2	..				per gal <td colspan="2"><td></td><td colspan="2">English.....</td><th>per 100 lb .90@ 1.00</th></td>	<td></td> <td colspan="2">English.....</td> <th>per 100 lb .90@ 1.00</th>			English.....		per 100 lb .90@ 1.00
29 gravity, 15 cold test.....	13 1/2 @14	..				per gal <td colspan="2"><td></td><td colspan="2">American.....<th>per 100 lb No. 1. 75@ .80</th></td></td>	<td></td> <td colspan="2">American.....<th>per 100 lb No. 1. 75@ .80</th></td>			American..... <th>per 100 lb No. 1. 75@ .80</th>		per 100 lb No. 1. 75@ .80
Summer.....	12 1/2 @13	..				per gal <td colspan="2"><td></td><td colspan="2">American.....<th>per 100 lb, No. 2. 60@ .65</th></td></td>	<td></td> <td colspan="2">American.....<th>per 100 lb, No. 2. 60@ .65</th></td>			American..... <th>per 100 lb, No. 2. 60@ .65</th>		per 100 lb, No. 2. 60@ .65
Cylinder, light filtered.....	20 1/2 @21	..				per gal <td colspan="2"><td></td><td colspan="2">Umber, T'key, Bnt. & Pow'd.....</td><th>2 1/2 @ 3</th></td>	<td></td> <td colspan="2">Umber, T'key, Bnt. & Pow'd.....</td> <th>2 1/2 @ 3</th>			Umber, T'key, Bnt. & Pow'd.....		2 1/2 @ 3
Dark, filtered.....	14 1/2 @15	..				per gal <td colspan="2"><td></td><td colspan="2">Turkey, Raw and Powdered.....</td><th>2 1/2 @ 3</th></td>	<td></td> <td colspan="2">Turkey, Raw and Powdered.....</td> <th>2 1/2 @ 3</th>			Turkey, Raw and Powdered.....		2 1/2 @ 3
Paraffine, 90-97 sp. gravity.....	13 1/2 @14	..				per gal <td colspan="2"><td></td><td colspan="2">Burnt, American.....</td><th>1 1/2 @ 2</th></td>	<td></td> <td colspan="2">Burnt, American.....</td> <th>1 1/2 @ 2</th>			Burnt, American.....		1 1/2 @ 2
90-97 sp. gravity.....	13 1/2 @14	..				per gal <td colspan="2"><td></td><td colspan="2">Raw, American.....</td><th>1 1/2 @ 2</th></td>	<td></td> <td colspan="2">Raw, American.....</td> <th>1 1/2 @ 2</th>			Raw, American.....		1 1/2 @ 2
88-93 sp. gravity.....	11 @11 1/2	..				per gal <td colspan="2"><td></td><td colspan="2">Yellow, Chrome, Pure.....</td><th>12 1/2 @15</th></td>	<td></td> <td colspan="2">Yellow, Chrome, Pure.....</td> <th>12 1/2 @15</th>			Yellow, Chrome, Pure.....		12 1/2 @15
Red.....	13 1/2 @14	..				per gal <td colspan="2"><td></td><td colspan="2">Vermilion, American Lead.....</td><th>7 @25</th></td>	<td></td> <td colspan="2">Vermilion, American Lead.....</td> <th>7 @25</th>			Vermilion, American Lead.....		7 @25
Miscellaneous—		per ton				per gal				Quicksilver, bulk.....		65 @ 66
White, Foreign.....	per ton \$18.50@20.50	..				per gal	<td></td> <td colspan="2">Quicksilver, bars.....</td> <th>66 @ 66</th>			Quicksilver, bars.....		66 @ 66
Amer. floated.....	per ton 17.00@18.00	..				per gal	<td></td> <td colspan="2">English, Imported.....</td> <th>65 @70</th>			English, Imported.....		65 @70
Off color.....	per ton 12.50@15.00	..				per gal	<td></td> <td colspan="2">Chinese.....</td> <th>\$0.90@1.00</th>			Chinese.....		\$0.90@1.00
Chalk, in bulk.....	per ton 3.00@ 3.40	..				per gal	<td></td> <td colspan="2"></td> <td></td>					
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Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33½ @ 33½ & 10% signifies

that the price of the goods in question ranges from 33½ per cent. discount to 33½ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued annually, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists" contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33½%
North's.....10%
Upson's Patent, per doz., \$29.90.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....10%
Ives' Stop Bead Screws and Washers.....10%
Taplin's Perfection.....10%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, per doz. pairs, Nos. 1, \$0.75; 2, \$0.60; 4, \$1.00; 5, \$0.50.
Fernald Quick Shifter, per doz. pairs.....\$2.00@3.00

Anvils—American—

Eagle Anvils.....per lb. @ 8¢
Hay-Budden, Wrought.....per lb. @ 9½¢
Trenton.....per lb. @ 9½¢

Imported—

Swedish Solid Steel Sisco, Superior, per lb.....10¢@10½¢
Peter Wright & Sons, per lb. 8 to 319 lb. 11¢; 350 to 600 lb. 11½¢.

Anvil, Vice and Drill—

Millers Falls Co., \$18.00.....15¢@10%
Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co.....10%

Augers and Bits—

Com. Double Spur.....75¢@10¢@80%
Jennings' Patn., Bright.....65¢@10¢@70%
Black Lip or Blued.....65¢@10¢@65%
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40¢@5%
Ford's Auger and Car Bits.....40¢@5%
Ft. Washington Auger Co., Concord's.....35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list, 25¢@7½%
No. 30, R. Jennings' list.....50%
Russell Jennings'.....25¢@10¢@2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....15%
Pugh's Black.....25%
Pugh's Jennings' Pattern.....60%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Swan's.....65¢@10¢@7½%
Swan's, Jennings' Pattern.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's Pattern, No. 1, per doz., \$26;
No. 2, \$18.....60¢@10%
Ford's, Clark's Pattern.....60¢@10%
C. E. Jennings & Co., Steer's Pat. 25%
Lavigne Pat., small size, \$18.00; large size, \$26.00.....60¢@10%
Swan's.....60%

Gimlet Bits—

Common Dbl. Cut.....per gro. \$3.00@3.25
German Pattern, Nos. 1 to 10, \$4.75; 11 to 13, \$5.75

Hollow Augers—

Bonney Pat., per doz. \$5.50@6.00
Ames.....20¢@10%
Universal.....20%

Ship Augers and Bits—

Ship Augers.....40¢@10¢@%
Ford's.....33½%
C. E. Jennings & Co.:
L'Hommedieu's.....6%
Watrous'.....33½%
Snell's.....48%

Awl Hatts—See Handles, Mechanics' Tool.

Awls—

Brad Awls:
Handled.....per doz. \$2.75@3.00
Unhdd, Shldered.....per doz. \$2.66@2.75
Unhdd, Patent.....per doz. \$2.66@2.75
Peg Awls:
Unhdd, Patent.....per doz. \$1.31@1.34¢
Unhdd, Shldered.....per doz. \$1.31@1.34¢
Scratch Awls:
Handled, Com.....per doz. \$3.50@4.00
Handled, Socket.....per doz. \$11.50@12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.
First Quality.....\$1.75@1.50
Second Quality.....\$1.25@1.50
Double Bit, base weights:
First Quality.....\$7.00@7.50
Second Quality.....\$6.50@6.75

Axle Grease—

See Grease, Axle.

Axles—

Iron or Steel.

Concord, Loose Collar.....¼¢@¼¢
Concord, Solid Collar.....¼¢@¼¢
No. 1 Common, Loose.....¾¢@1¢
No. 1½ Com., New Style.....¼¢@¼¢
No. 2 Solid Collar.....¼¢@¼¢
Half Patent:
Nos. 7, 8, 11 and 12.....70%
Nos. 13 to 14.....70%
Nos. 15 to 18.....70¢@10¢@70¢@5%
Nos. 19 to 22.....70¢@10¢@70¢@5%

Boxes, Axles—

Common and Concord, not turned.....lb. 5¢@6¢
Common and Concord, turned, lb. 6¢@7¢
Half Patent.....lb. 9½¢@10¢

Bait—

Fishing—

Hendryx:
A Bait.....20%
B Bait.....20%
Competitor Bait.....20%

Balances—

Sash—

Caldwell new list.....50¢@10%
Pullman.....50¢@10%

Spring—

Light Spring Balances.....60¢@60¢5%
Chatillon's:
Light Spg. Balances.....50¢@50¢10%
Straight Balances.....49¢@40¢10%
Circular Balances.....50¢@10%
Large Dial.....30%

Barb Wire—See Wire, Barb.

Bars—

Crow—

Steel Crowbars, 10 to 40 lb. per lb., 2¼¢@2½¢

Towel—

No. 10 Ideal, Nickel Plate.....per gro. \$8.50

Beam, Scale—

Scale Beams.....40%
Chatillon's No. 1.....30%
Chatillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered per doz. \$0.80;
Tinned.....\$0.85
No. 11 Wire Coppered per doz. \$1.15;
Tinned.....\$1.20
No. 10 Wire Tinned.....per doz. \$1.50

Beaters Egg—

Dover Stamping & Mfg. Co.:
Genuine Dover, per gro., No. 1, Tumbler Size, \$7.50; No. 2, Family Size, \$7.50; No. 3, Extra Family Size, \$24.00; No. 4, Hotel Size, \$30.00.
Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, \$0.80;
No. A, Jap'd, \$1.15; No. B, Jap'd, \$1.85; No. 6, Jap'd, \$1.65;
Lyon, Jap'd, per doz., No. 2, \$1.35.

Taplin Mfg. Co.: Improved Dover, per gro., No. 60, \$6.00; No. 75, \$6.50; No. 100, \$7.00; No. 102, Tin'd, \$8.50; No. 150, Hotel, \$15.00; No. 152, Hotel Tin'd, \$17.00; No. 200, Tumbler, \$8.50; No. 202, Tumbler Tin'd, \$9.50; No. 300, Mammoth, per doz., \$25.00.

Bellows—

Blacksmith, Standard List:
Split Leather.....60¢@10¢@65%
Grain Leather.....50¢@50¢10%
Hand—
Inch.....6 7 8 9 10
Doz. \$5.00 5.50 6.00 6.50 7.50

Molders—

Inch.....10 12 14 16
Doz. \$7.50 9.00 12.00 15.00

Bells—

Cow—

Wrought Cow Bells.....75%
Jersey.....75¢@10%
Texas Star.....50%

Door—

Home, R. & E. Mfg. Co.'s.....55¢@10%

Hand—

Polished, Brass.....60¢@60¢10%
White Metal.....60¢@60¢10%
Nickel Plated.....50¢@10%
Swiss.....50¢@10%
Cone's Globe Hand Bells.....33½¢@35%

Miscellaneous—

Farm Bells.....lb. 2¼¢@2½¢
Church and School.....60¢@60¢10%

Belting—

Leather—

First Quality, Ex. Hy., Strictly Short Lap.....60¢@10%
Standard.....70¢@10¢@70¢@5%
Light Double.....75¢@10%
Cut Leather Lacing.....50%
Leather Lacing Sides, per sq. ft. 23¢@24¢

Rubber—

Competition (Low Grade).....70¢@10¢@75%
Standard.....60¢@10¢@70%
Best Grades.....40¢@50%

Bench Stops—

See Stops, Bench

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters.....20%

Bicycle Goods—

John B. Leng's Son & Co.'s 1908 list:
Chain, Parts, Spokes.....50%
Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

Blocks Tackle—

Common Wooden.....75¢@75¢5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50¢@10%
Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50¢@10%; Wire Rope Snatch, 50%.

Lane's Patent Automatic Lock and Junior.....30%
See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined.....55%
Embossed.....55%

Boards, Wash—

See Washboards.

Bobs, Plumb—

Keuffel & Esser Co.....33½¢@10%

Bolts

Carriage, Machine, &c.—

Common Carriage (cut thread):
¾ x 6 and smaller.....75¢@10%
Larger and longer.....70¢@10%
Phila. Eagle, \$3.00 list.....80%
Bolt Ends.....70¢@10%
Machine (Cut Thread):
¾ x 4 and smaller.....75¢@10%
Larger and longer.....70¢@10%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knobs:
Inch.....3 4 5 6 8
Per doz. \$0.30 .35 .45 .60 .80

Cast Iron Spring Foot, Jap'd:
Inch.....6 8 10
Per doz. \$1.20 1.50 2.25

Cast Iron Chain, Flat, Japanned:
Inch.....6 8 10
Per doz. \$1.00 1.40 1.65

Cast Iron Flat Shutter, Jap'd, Brass Knobs:
Inch.....6 8 10
Per doz. \$0.75 .95 1.25

Wrought Barrel Japanned, 80¢@10¢@80¢10¢5%

Barrel Bronzed.....60¢@10%
Spring.....70¢@10¢@70¢10¢10%
Shutter.....50¢@50¢10¢5%
Square Neck.....75¢@75¢10%
Square.....70¢@10¢@10¢80%
Ives' Mortise.....10%
Ives' Wrought Metal.....10%

Expansion—

F. H. Evans' Crescent.....40¢@60%
Richards Mfg. Co.....55¢@10%
Star Expansion Bolt Co.:
Star, Lag Screw Type, 60¢@10¢5%
Star, Wood Screw Type.....40%
Star, Machine, Single Wedge.....60%

Star, Machine, Double Wedge.....60%

Steward & Romain Mfg. Co.:
Style No. 13, Double.....60%
Style No. 1 Single.....60%
Style No. 100, Dbl. Jaw, Single.....55%
Lag Screw.....66%

Plow and Stove—

Plow.....65¢@70%
Stove.....85¢@85¢5%

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Co.:
Norway Phila., list Oct. 16, '94.....90%
Eagle Phila., list Oct. 16, '94.....82½%
Ray State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '94.....80%
Eagle Phila., list Oct. 16, '94.....82½%
Eclipse, list Dec. 28, '99.....80%
Russell, Burdall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct. '94.....82½%
Eagle.....82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99.....90%
Phila., Eagle, list Oct. 16, 1881.....82½%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Bung—

Borers Bung, Ring, with Handle:
Inch.....1¼ 1½ 1¾ 2
Per doz. \$4.80 5.60 6.40 8.00

Inch.....2¼ 2½
Per doz. \$8.65 11.50

Enterprise Mfg. Co., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....25%
Langdon, New Langdon and Langdon Improved, 20¢@10%; Langdon Acme.....15¢@10%
Perfection.....40%
Seavey.....45%

Braces—

Common Ball, American.....\$1.50
Barber's.....50¢@10¢@60¢10%
Fray's Genuine Spofford's.....60%
Fray's No. 61, 100, 200, 614.....50%
C. E. Jennings & Co.....50¢@5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat. 50%
Millers Falls Drill Braces.....25¢@10%
P. S. & W. Co., Peck's Pat. 60¢@10%

Brackets—

Wrought Steel.....75¢@10¢@80%
Bradley Metal Clasp.....80¢@10¢@80¢5%
Griffin's Pressed Steel.....75¢@75¢10%
Griffin's Folding Brackets.....70¢@10%
Taplin Victor Handy Egg Beater Bracket.....per doz. \$1.50

Bright Wire Goods—

See Wire and Wire Goods.

Broilers—

Kilbourne Mfg. Co.....75¢@20%
Wire Goods Co.....75%

Buckets, Galvanized—

Mfr's list, price per gross:
Quart. 10 12 14
Water, Reg.....26.85 29.50 33.50
Water, Hvy.....45.35 48.00 52.00
Fire, Rd. Btm. 32.00 34.65 38.65
Well.....37.35 41.35 45.35

Bull Rings—See Rings, Bull.

Butts—

Wrought, High List, Oct. 26, '06, 65%
Cast Brass, Tiebout's.....40¢@10%

Cast Iron—

Fast Joint, Broad.....40¢@10¢@50%
Fast Joint, Narrow.....40¢@10¢@50%
Loose Joint.....70¢@10¢@75%
Loose Pin.....70¢@10¢@75%
Mayer's Hinges.....70¢@70¢5%
Parliament Butts.....70¢@70¢5%

Wrought Steel—

Bright

Light Narrow, Light Reversible.....70¢@5%
Reversible and Broad, 70¢@5%
Loose Joint, Narrow, Light Inside Blind, &c.....70%
Back Flaps, Table Chest, 65% Japanned.

Light Narrow, Loose Pin.

Light Narrow, Ball Tip.....40¢@5%
Broad.....40¢@5%
Steeple Tipped.....70%
Ball Tipped.....70%

Extra, 10¢

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list; 1200, 15%; 200, 300, 500
Hendryx Bronze: Series 700, 800, 900
Hendryx Enamelled.....35%

Calipers—See Compasses.**Calks, Toe and Heel—**

Blunt, 1 prong, per 100 lb., \$3.50 @ \$3.85
Sharp, 1 prong, per 100 lb., \$4.00 @ \$4.35
Buck's, 1 pg. Blunt Toe, 3/4¢; 2 pg. Blunt Toe, 4/4¢; 1 pg. Sharp Toe, 4/4¢; 2 pg. Sharp, 4/4¢; Blunt Heel, 4/4¢; Sharp Heel, 4/4¢
Lautier, Blunt, 4/4¢; Sharp, 4/4¢
Perkins', Blunt, 1 lb, 3.65¢; Sharp, 4.15¢

Can Openers—

See Openers, Can.

Caps, Percussion—

Eley's E. B.52¢ @ 55¢
F. D.per M \$3.43 @ 35¢
G. L.per M \$4.00 @ 42¢
G. F.per M \$4.48 @ 50¢
Musketper M \$6.20 @ 65¢

Primers—

Berdan Primers, \$2 per M. 20¢
Primer Shells and Bullets, 15¢ @ 10¢
All other primers per M. \$1.52 @ 1.60

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Blank Cartridges:
32 C. F., \$5.50.....10¢ @ 5¢
38 C. F., \$7.00.....10¢ @ 5¢
22 cal. Rim, \$1.50.....10¢ @ 5¢
32 cal. Rim, \$2.75.....10¢ @ 5¢
B. B. Caps, Con. Ball, Sued. \$1.00
B. B. Caps, Round Ball, \$1.10
Central Fire.....25¢
Target and Sporting Rifle, 15¢ @ 10¢
Primer Shells and Bullets, 15¢ @ 10¢
Rim Fire, Sporting.....50¢
Rim Fire, Military.....15¢ @ 5¢

Casters—

Red65¢ @ 10¢ @ 70¢
Plate60¢ @ 60¢ @ 45¢
Philadelphia70¢ @ 10¢ @ 75¢
Acme, Ball Bearing.....35¢
Gem (Roller Bearing).....70¢ @ 10¢ @ 10¢
Steel Gem (Roller Bearing).....70¢
Standard Ball Bearing.....45¢ @ 10¢
Yale (Double Wheel) low list.....40¢ @ 10¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Proof Coil—

American Coil, Straight Link:
3-16 1/4 5-16 3/8 1/2 5/8
\$7.80 5.20 4.25 3.60 3.40 3.20
3/4 1/2 1 1 1/2 1 1/2 inch.
\$3.10 3.20
In cast lots, deduct 25¢.
German Coil.....70¢
German Pattern Coil.....70¢ @ 10¢ @ 5¢
6-0 to 1.....60¢ @ 10¢ @ 10¢
2 and 3.....60¢ @ 10¢ @ 10¢
4, 5 and 6.....50¢ @ 10¢ @ 50¢ @ 10¢ @ 5¢

Halter—

Halter Chains.....60¢ @ 5¢ @ 60¢ @ 10¢
German Pattern Halter Chains.
List July 23, '07.....60¢ @ 10¢ @ 70¢
Covert Mfg. Co.:
Halter.....35¢ @ 5¢

Cow Ties—

See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr. 6 1/2-6.3, Straight, with ring, \$28.00
6 1/2-6.2, Straight, with ring, \$29.00
6 1/2-8.2, Straight, with ring, \$32.00
6 1/2-10.2, Str'tght, with ring, \$37.00
NOTE—Add 2¢ per pair for Hooks
Twist Traces: add per pair for Nos. 2 and 3, 2¢; No. 1, 3¢; No. 0, 4¢ to price of Straight Link.
Eastern Standard Traces, Wagon Chain, &c.....60¢ @ 10¢ @ 60¢ @ 10¢ @ 5¢

Miscellaneous—

Jack Chain, list July 10, '03:
Iron60¢ @ 10¢ @ 60¢ @ 10¢ @ 10¢
Brass65¢
Safety and Plumbers' Chain, 75¢
Gal. Pump Chain.....1b., 4 1/2¢ @ 5¢
Bridgeport Chain Co.:
Triumph Halter and Coll., 35¢ @ 2 1/2¢ @ 40¢
Triumph Dog.....50¢ @ 10¢ @ 60¢
Brown Halter and Coll., 45¢ @ 50¢ @ 5¢
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion.....40¢
Onaida Community:
American Halter, Dog and Kennel Chains.....35¢ @ 2 1/2¢ @ 40¢
Niagara Dog Leads and Kennel Chains.....45¢ @ 50¢ @ 5¢
Wire Goods Co.:
Dog Chain.....70¢
Universal Dbl.-Jointed Chain.....70¢

Chain and Ribbon, Sash—

Onaida Community:
Steel Chain.....60¢
Pullman:
Bronze Chain, 60%; Steel Chain, Coppered.....60¢ @ 10¢
Sash Chain Attachments, per set, 8¢
Aluminum Sash Ribbon, per 100 ft.....\$2.00 @ \$5.00
Sash Ribbon Attachments, per set, 8¢

Chalk—

Carpenters' Blue.....gro., 50¢
Carpenters' Red.....gro., 50¢
Carpenters' White.....gro., 40¢

Checks, Door—

Bardsley's.....45¢
Pullman, per gro.....\$4.00
Russwin.....35¢

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55¢
Youths' Chests, with Tools.....40¢
Gentlemen's Chests, with Tools.....35¢
Farmers', Carpenters', etc., Chests, with Tools.....20¢
Machinists' and Pipe Fitters' Chests, Empty.....45¢
Tool Cabinets.....45¢
C. E. Jennings & Co.'s Machinists' Tool Chests.....75¢

Chisels—

Socket Framing and Firmer Standard List.....30¢ @ 10¢ @ 30¢
Buck Bros.....30¢
C. E. Jennings & Co.:
Socket Firmer No. 10.....25¢ @ 7 1/2¢
Socket Framing No. 15.....25¢ @ 7 1/2¢
Swan's.....65¢ @ 70¢
L. & I. J. White & Co.....30¢ @ 30¢ @ 5¢

Tanged—

Tanged Firmers.....30¢ @ 35¢
Buck Bros.....30¢
C. E. Jennings & Co. Nos. 191, 181, 25¢
L. & I. J. White Co.....25¢ @ 5¢

Cold—

lb.
Cold Chisels, good quality, 13¢ @ 15¢
Cold Chisels, fair quality, 11¢ @ 12¢
Cold Chisels, ordinary.....9¢ @ 10¢

Chucks—

Almond Drill Chucks.....35¢
Almond Turret Six-Tool Chuck.....10¢
Beach Pat, each \$8.00.....35¢ @ 5¢
Empire.....25¢
Blacksmiths'.....25¢
Jacobs' Drill Chucks.....35¢
Pratt's Positive Drive.....25¢
Skinner Lathe Chucks:
Independent.....35¢
Universal, Reversible Jaws.....35¢
Universal, Com. Style Jaws.....40¢
Combination, Reversible Jaws.....35¢
Combination, Com. Style Jaws.....40¢
Round Body or Box Body, 2 Chuck Jaws.....25¢
Geared Scroll Chucks.....25¢
Drill Chucks:
New Model, 25%; Geared Pattern, 25%; Skinner Patent.....25¢
Positive Drive.....40¢
Planer Chucks.....20¢
Standard.....45¢
Drill Press Vises.....30¢
Face Plate Jaws.....35¢
Standard Tool Co.:
Improved Drill Chuck.....45¢
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21.....35¢
Scroll Combinations, Nos. 83 and 84.....40¢
Geared Scroll, Nos. 33, 34 and 35.....25¢
Independent Iron, Nos. 18 and 318, 25¢
Independent Steel, No. 61.....25¢
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104.....35¢
Union Czar Drill.....25¢
Universal, 11, 12, 16, 17, 13, 14, 15, 40¢
Universal No. 42.....35¢
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50.....35¢
Steel Face Plate Jaws, Nos. 70 and 72.....30¢
Westcott Patent Chucks:
Lathe Chucks.....50¢
Little Giant Auxiliary Drill.....50¢
Little Giant Double Grip Drill.....50¢
Little Giant Drill, Improved.....50¢
Oneida Drill.....50¢
Scroll Combination Lathe.....50¢
Whitaker Mfg. Co.:
National Drill.....25¢

Clamps—

Carriage Makers' Star, P., S. & W. Co.....50¢
Besly, Parallel.....33¢ @ 10¢
Hammer & Co.:
Adjustable.....20¢ @ 5¢
Carriage Makers' H. P. Screw, 40¢ @ 5¢
Myers' Hay Rack.....65¢
Lineman's Swedish Neverturn.....65¢
Saw Clamps, see Vises, Saw Filers'

Cleaners, Drain—

Iwan's Champion, Adjustable.....50¢
Iwan's Champion, Stationary.....40¢

Sidewalk—

American Fork & Hoe Co.:
Star Socket.....per doz. \$4.00 net
Star Shank.....per doz. \$3.50 net
Shank, per doz., x 7/8, \$3.50; Shank, x 8.....\$3.75

Cleavers, Butchers—

Foster Bros.....30¢
Fayette B. Plumb.....30¢
L. & I. J. White Co.....30¢

Clippers, Horse and Sheep—

Chicago Flexible Shaft Co.:
1902 Chicago Horse, each, \$10.75
20th Century Horse, each, \$5.00
Lightning Belt Horse, each, \$15.00
Chicago Belt Horse, each, \$20.00
Stewart's Enclosed Gear Roll Bearing Horse, each.....\$6.75
Stewart's New Model Sheep Shearing Machine, each, \$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each.....\$9.75

Clips, Axle—

Regular Styles, list July 1, '05, 80¢ @ 80¢ @ 10¢

Cloth and Netting, wire—

—See Wire, &c.

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c.....75¢
Compression Bibbs.....70¢

Coffee Mills—

—See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40¢
Leather, Walter B. Stevens & Son's list.....60¢

Compasses, Dividers, &c.—

Ordinary Goods.....70¢ @ 10¢ @ 75¢

Conductor Pipe,—

L. C. L. to Dealers:
Gal. Steel. Charcoal. Copper.

Northeastern:
70¢ @ 10¢ 50¢ @ 10¢ 7 1/2¢ 50¢ @ 10¢

Eastern:
70¢ @ 10¢ 50¢ @ 10¢ 7 1/2¢ 50¢ @ 10¢

Central:
75¢ @ 5¢ 60% 50¢ @ 10¢

Northeastern:
75¢ @ 2 1/2¢ 60% 50¢ @ 10¢

Western:
70¢ @ 7 1/2¢ 50¢ @ 12 1/2¢ 50¢ @ 5¢

Tennessee:
70¢ @ 10¢ 50¢ @ 12 1/2¢ 50¢ @ 10¢

Southern:
70% 50¢ @ 12 1/2¢ 50¢ @ 5¢

Southwestern:
70% 50¢ @ 5¢ 50¢ @ 5¢

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.

See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:
Gal.....2 3 4 6 8
Galvanized, ea. \$1.85 \$2.00 \$2.25 \$2.50 \$3.00
Galvanized, Lined, side handles, 6 8
Each.....\$1.95 \$2.15 \$2.40 \$3.30 \$1.15
White Enamelled.....10%
Agate Lined.....10%

Coppers' Tools—

See Tools, Coopers'.

Coppers, Soldering—

Soldering Coppers, 3 lb. to pair and heavier, 20¢; lighter than 3 lb. to pair.....22¢

Cord—

Sash—

Braided, Drab.....1b. 35¢

Braided, White, Com., Nos. 8 to 12, 21¢; No. 7, 21¢; No. 6, 21¢.

In lots of 12 doz. or over, 1 cent less per pound.

Cable Laid Italian, lb., No. 18, 37¢

Italian, lb., A, No. 18, 25¢; B, 22¢

Common India.....lb. 11¢ @ 11¢

Cotton Sash Cord, Twisted, 18¢ @ 20¢

Patent Russia.....lb. 20¢

Cable Laid Russia.....lb. 21¢

India Hemp, Br'd'd.....lb. 21¢

India Hemp, Twisted.....lb. 13¢ @ 11¢

Patent India, Twisted.....lb. 17¢

Pearl Braided, cotton, No. 6, 31¢ lb.

20¢; No. 7, 19¢; No. 8, 8 to 12, 19¢; in 12 doz. to 100 doz. lots, 26¢; 26¢; 26¢; 27¢

Edystone, Braided, Nos. 8 to 12, 26¢; 26¢; 26¢; 27¢

Harmony Cable Laid Italian, Nos. 7 to 10, 26¢; 26¢; 26¢; 27¢

Pullman:
Wire Sash Cord.....10%

Sash Cord Attachments, per 100, \$2.00

Samson, Nos. 8 to 12:

Braided, 3 lb. Drab Cotton, 50¢; Italian Hemp, 40¢ @ 50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢

Massachusetts, White.....per lb. 40¢

Massachusetts, Drab.....per lb. 45¢

Phoenix, White, Nos. 8 to 12.....27¢

Silver Lake, per lb.:
A, Drab, 15¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen.....57¢

See also Chain and Ribbon.

Wire, Picture—

Full Length.....90¢ @ 20¢ @ 20¢

Short Length.....90¢ @ 20¢ @ 20¢

Hendryx Standard Wire Picture Cord, old list, 85¢ @ 10%

Turner & Stanton Co. Wire Picture Cord.....90%

Cradles—

Grain.....50%

Crayons—

White Round Crayons, Casco, 100 gro. \$5.00, \$8.50, \$9.00 and \$10.00 according to grade.

Zelnicke's Lumber: per gro.
White and Purple, Indelible.....\$7.50

Blue, Red, Green, Yellow and Terra Cotta, \$6.50; Black.....\$4.50

Giant Lumber, 5 1/4 in. x 15-16 in. round, all colors, \$12.00; Indelible, \$14.00; Blacks.....\$10.00

Genuine Soapstone, Metal Workers' 5 in. x 1 1/4 in. Round, \$2.50; 5 in. x 1 1/4 in. Square, \$1.75; 5 x 1 1/2 x 3-16, \$2.50; 5 x 1 1/4 x 3-16.....\$3.00

Suremark, Black, \$2.25; Blue, Red and Yellow.....\$2.50

Crooks, Shepherds—

American Fork & Hoe Co.:
Montana.....per doz. \$4.50

Crow Bars—See Bars, Crow.

Cultivators—

American Fork & Hoe Co.:
Victor Garden.....50¢ @ 10%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, per doz. \$3.50

Star, Eagle, Rogers & Hamilton and Anchor.....per doz. \$3.00

Wm. Rogers & Son.....per doz. \$2.50

Cutters—

H. H. Mayhew Co.....40%

Red Devil.....60%

R. Mfg. Co.....40%

Woodward.....50%

Meat and Food—

American.....30%

Nos. 401 402 403 404 405 406 407

Each.....\$5 \$7 \$10 \$12 \$25 \$30 \$60

Enterprise:
Nos. 5 10 12 22 32

Each.....\$2 \$3 \$2.75 \$4.50 \$6 \$5.50 \$7.50

No. 202, \$1.50 \$2.00 \$4.00 \$7.50

F. S. & W. Co.:
Ideal.....40¢ @ 10¢ @ 5¢

Hales.....60¢ @ 5¢

Little Giant.....per doz. 40¢ @ 50¢

Nos. 305 310 312 320 322

\$35.00 \$48.00 \$44.00 \$72.00 \$68.00

New Triumph No. 605, per doz. \$24.00, 40%

Russwin Food, No. 1, \$24.00; No. 2, \$27.00; 3, \$12.00.....45¢ @ 10¢

Saw Cutters, 1 Knife.....\$15.00 \$18.00

Enterprise Beef Shavers.....25¢ @ 30%

Saw and Kraut—

Henry Diston & Sons:
Saw and Kraut Cutters.....35%

Corn Graters.....30%

J. M. Mast Mfg. Co.:
Saw Cutters, 1 Knife.....per doz. \$3.00

Combined Saw Cutter and Corn Grater.....per doz. \$4.00

Tobacco—

All Iron, Cheap.....doz. \$4.25 @ 4.50

Enterprise.....25¢ @ 30%

National, per doz., No. 1, \$21; No. 2, \$18.....40%

Diggers, Post Hole, &c—

Diston's:
Rapid, per doz., \$24.00.....25%

Samson, per doz., \$14.00.....25%

Iwan's Pat. Post Hole and Well Auger.....40%

Vaughan Pattern Post Hole Augers, per doz., \$7.00

Perfection Post Hole Diggers, per doz., \$8.50

Split Handle Post Hole Diggers, per doz., \$7.50

Hercules Pattern, per doz., \$7.50

Kohler's, per doz., Universal, \$14.00; Little Giant, \$12.00; Hercules, \$10.00; Invincible, \$9.00; Rival, \$8.50; Pioneer.....\$7.50

Never-Break Crucible Steel Post Hole Diggers.....60%

Dividers—See Compasses.**Drawing Knives—**

See Knives, Drawing.

Dressers Emery Wheel—

Sterling Emery Wheel Dressers.....35

10-lb. cans, 7¢ 7¢ 6¢
 10-lb. cans, less
 than 10, 10¢ 10¢ 8¢
 Less quantity, 10¢ 10¢ 8¢
 NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extensions, Bit—

Ford's Auger Bit Extensions, 40¢ & 50¢
 Ext. actors, emon Juice—
 —See Squeezers, Lemon.

Fasteners, Blind—

Zimmerman's Jap'd and Galv., 50 & 55¢
 Walling's, 50¢
 Upson's Patent, 40¢

Cord and Weight—

Ives, 10¢
 Titan, 10¢

Corrugated—

Acme Corrugated Fasteners, 70%

Faucets—

Cork Lined, 50¢ & 60¢
 Metallic Key, Leather Lined, 60¢ & 70¢

Red Cedar, 40¢ & 50¢
 Petroleum, 70¢ & 80¢

B. & L. B. Co., 60¢ & 70¢
 Metal Key, 60¢
 Star, 60¢
 West Lock, 50¢ & 60¢

John Sommer's Peerless Tin Key, 40¢
 John Sommer's Boss Tin Key, 50¢
 John Sommer's Victor Mtl. Key, 50¢ & 60¢
 John Sommer's Duplex Metal Key, 60¢
 John Sommer's Diamond Lock, 40¢
 John Sommer's I.X.L. Cork Lined, 50¢ & 60¢
 John Sommer's Reliable Cork Lined, 50¢ & 60¢

John Sommer's Chicago Cork Lined, 60¢
 John Sommer's O. K. Cork Lined, 50¢
 John Sommer's No Brand, Cedar, 40¢
 John Sommer's Perfection, Cedar, 40¢

Self Measuring, 40¢
 Enterprise, Self Measuring and Pump, 40¢ & 50¢
 Lane's, 40¢ & 50¢
 National Measuring, 40¢ & 50¢

Felloe Plates—

See Plates, Felloe.

Files— Domestic—

List Nov. 1, 1899.

Best Brands, 70¢ & 80¢
 Standard Brands, 75¢ & 85¢
 Lower Grade, 75¢ & 85¢
 Gold Medal, 70¢
 McCaffrey's American Standard, 60¢ & 70¢

Imported—

Stubs' Tapers, Stubs' List, July 24, '97, 33¢ & 40¢

Fixtures, Fire Door—

Richards Mfg. Co., 103; Special, No. 104, 33¢ & 40¢
 Fusible Links, No. 96, 50¢
 Expansion Bolts, No. 107, 60¢ & 70¢

Grindstone—

Net Prices: 15¢ 17¢ 19¢ 21¢
 Per doz., \$3.60 3.85 4.15 4.65
 Peck, Stow & Wilcox Co., 15¢ 17¢ 19¢ 21¢
 In, 4.00 4.40 4.75 5.50 6.50, 30¢
 Reading Hardware Co., 60¢

Fodder Squeezers—

See Compressors.

Forks—

American Fork & Hoe Co., 70¢ & 80¢
 Iowa Dig-Ezy Potato, 45¢ & 50¢
 Hay, Regular, 3-time, 45¢ & 50¢
 Hay, Regular, 4-time, 60¢ & 70¢
 Champion, Hay, 60¢ & 70¢
 Acme, Hay, 60¢ & 70¢
 Manure, Regular, 4-time, 65¢ & 75¢
 Manure, Regular, 5 and 6 time, 70¢
 Champion, Manure, 65¢ & 75¢
 Columbia, Manure, 70¢
 Acme, 4-time, 60¢ & 70¢
 Round Shoulder Header, 4-time, 65¢
 Champion, Header, 65¢
 Dakota, Header, 65¢
 Kansas Header, 65¢
 Wood, Barley, 35¢ & 45¢
 Steel, Barley, 65¢
 Columbia, Spading, 70¢ & 80¢

Frames— Wood Saw—

White, S'g't Bar, per doz. 75¢ & 80¢
 Red, S'g't Bar, per doz. 1.00¢ & 1.25
 Red, Dbl. Bruc, per doz. 1.10¢ & 1.50

Freezers, Ice Cream—

Qt., 1 2 3 4 6
 Each, \$1.25 \$1.60 \$1.90 \$2.20 \$2.80

Fruit and Jelly Presses—

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.

Fuse—

Per 1000 Feet.
 Hemp, 3.25
 Cotton, 3.20
 Waterproof Spl. Taped, 3.65
 Waterproof Dbl. Taped, 4.40
 Waterproof Tpl. Taped, 5.15

Gates, Molasses and Oil—
 Stebbins' Pattern, 80¢ & 90¢

Gauges—

Marking, Mortise, 50¢ & 60¢
 Chapin-Stephens Co., 50¢ & 60¢
 Marking, Mortise, 50¢ & 60¢
 Diston's Marking, Mortise, 60¢ & 70¢
 Wire, Brown & Sharpe's, 35¢ & 40¢
 Wire, Morse's, 25¢
 Wire, P. S. & W. Co., 35¢ & 40¢

Gimlets— Single Cut—

Numbered assortments, per gro.

Nail, Metal, No. 1, \$2.00; 2, \$2.50
 Spike, Metal, No. 1, \$1.00; 2, \$1.50
 Nail, Wood Handled, No. 1, \$2.50; 2, \$3.00
 Spike, Wood Handled, No. 1, \$1.50; 2, \$2.00

Glass, American Window

See Trade Report.

Glasses, Level—

Chapin-Stephens Co., 65¢ & 70¢

Glue, Liquid Fish—

Bottles or Cans, with Brush, 25¢ & 30¢
 Elwell's, 40¢

Grease, Axle—

Common Grade, gro. \$6.00 & \$6.50
 Dixon's Everlasting, 10-lb. pails, ea. 85¢; in boxes, 10 doz., 1 lb., \$1.20;
 2 lb., \$2.00
 Helmet Hard Oil, 25¢

Griddles, Soapstone—

Pike Mfg. Co., 33¢ & 35¢ & 40¢

Grinders—

Pike Mfg. Co., 33¢ & 35¢ & 40¢

Hand and Foot Power, Pyko Nos. 1, 2, 3; Pyko Primo; Pyko Peerless; Pyko Spiral (foot power), 33¢ & 40¢
 Mower Knife and Tool, \$5.00, 40¢ & 50¢
 Royal Mfg. Co., 40¢ & 50¢
 Aluminum Grinding Machines, each, No. 01, \$1.75; 1A, \$2.50; 10, \$5.00
 Aluminum Sickle Grinders, each, No. 20, \$5.00; 20A, \$6.00; 20B, \$6.50
 Combined, \$6.50, 30¢
 Aluminum Disc Grinders, each, \$2.50, 30¢

Grindstones—

Pike Mfg. Co., 33¢ & 35¢ & 40¢

Improved Family Grindstones, 1/2 inch, 1/2 doz., \$2.00, 23¢ & 25¢
 Richards Mfg. Co., Eli and Cycle, Ball Bearing, mounted, 40¢

Grips, Nipple—

Perfect Nipple Grips, 40¢ & 45¢

Halters and Ties—

Cow Ties, 65¢ & 70¢
 Bridgeport Chain Co., 40¢
 Triumph Coll and Halters, 35¢ & 40¢
 Brown Coll and Halters, 35¢ & 40¢
 Brown Cow Ties, 50¢ & 60¢
 Brown Tie Outs, 70¢ & 80¢
 Covert Mfg. Co., 30¢ & 40¢
 Web, 30¢ & 40¢
 Jute Rope, 35¢
 Sisal Rope, 20¢
 Cotton Rope, 15¢
 Hemp Rope, 15¢
 Onida Community, 40¢ & 50¢
 Am. Coll and Halters, 40¢ & 50¢
 Am. Cow Ties, 45¢ & 50¢
 Niagara Coll and Halters, 45¢ & 50¢
 Niagara Cow Ties, 45¢ & 50¢

Hammers—

Handled Hammers—
 Heller's Machinists', 55¢ & 60¢ & 65¢ & 70¢
 Heller's Farriers', 40¢ & 50¢ & 60¢ & 70¢
 Peck, Stow & Wilcox Co., 40¢ & 50¢
 Crucible Steel, 40¢ & 50¢
 Farriers', 40¢ & 50¢
 Riveting, 40¢ & 50¢
 Machinists', 60¢ & 70¢
 Blacksmiths', 50¢
 Fayette Pl. Plumb, 40¢ & 50¢
 A. E. Nail, 40¢ & 50¢
 Eng. and B. S. Hand, 50¢ & 60¢
 Machinists' Hammers, 60¢ & 70¢
 Rivet and Tappers, 40¢ & 50¢
 Victor Magnetic Tack, 1/2 gro., \$7.75

Heavy Hammers and Sledges—

Under 3 lb., per lb., 50¢ & 60¢
 3 to 5 lb., per lb., 40¢ & 50¢
 Over 5 lb., per lb., 30¢ & 40¢
 Over 5 lb., per lb., 30¢ & 40¢

Handles—

Agricultural Tool Handles
 Ave, Pick, 60¢ & 70¢ & 80¢ & 90¢
 Hoe, Rake, 60¢ & 70¢
 Fork, Shovel, Spade, 40¢
 Long Handles, 40¢
 D Handles, 40¢

Cross-Cut Saw Handles—

Atkins', 40¢
 Champion, 50¢
 Diston's, 50¢

Mechanics' Tool Handles—

Auger, assorted, gro. \$3.00 & \$3.50
 Brad Axl., 1.65¢ & 1.75
 Chisel Handles, Ass'd, per gro.:
 Tanged Firmer, Apple, \$2.40
 \$2.65; Hickory, \$2.15 & 2.40
 Socket Firming, Apple, \$1.75
 \$1.95; Hickory, 1.60 & 1.75
 Socket Framing, Hickory, 1.60 & 1.75

File, assorted, gro. \$1.30 & \$1.50
 Hammer, Hatchet, 60¢ & 70¢ & 80¢ & 90¢
 Hand Saw, Varnished, doz., 80¢
 85¢; Not Varnished, 65¢ & 75¢
 Plane Handles:
 Jack, doz., 30¢; Fore, doz., 45¢
 Chapin-Stephens Co., 30¢ & 40¢
 Carving Tool, 30¢ & 40¢
 Chisel, 60¢ & 70¢
 File and Axl., 60¢ & 70¢
 Saw and Plane, 30¢ & 40¢
 Screw Driver, 30¢ & 40¢
 Millers Falls Adj. and Ratchet Auger Handles, 15¢ & 20¢
 Nicholson Simplicity File Handle, 1/2 gro. \$0.85 & \$1.50

J. L. Osgood:
 Indestructible File and Tool, 1/2 gro., No. 1, \$9.00; No. 2, \$8.50;
 No. 3, \$9.00; No. 4, \$9.50;
 5, \$10.00, gro. lots 10%

W. A. Zelnicker Supply Co.

Hammer, 1/2 doz., 12 in., \$2.00;
 14 in., \$2.00; 16 in., \$2.30; 18 in., \$2.60; 20 in., \$2.90; 22 in., \$3.00; 24 in., \$3.30; 26 in., \$3.50;
 30 in., \$3.80

Sledge, 1/2 doz., oval, 30 in., \$3.80; octagon, 30 in., \$3.80;
 oval, 36 in., \$4.00; octagon, 36 in., \$4.00

Axe, 1/2 doz., 28 to 34 in., \$5.60;
 36 in., \$5.80
 Adze, 1/2 doz., 36 in., \$5.80; 36 in., \$7.80

Pick, 1/2 doz., R. R. 36 in., \$8.00; coal, 34 in., \$5.80

Hatchet, 1/2 doz., 12 to 14 in., \$2.00

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track and Parlor Door Hangers per double set with track, etc.

Chicago Spring Butt Co.

Friction, 25¢
 Oscillating, 25¢
 Big Twin, 25¢

Chisholm & Moore Mfg. Co.:
 Baggage Car Door, 50¢
 Elevator, 30¢
 Railroad, 50¢

Cronk & Carrier Mfg. Co.:
 Loose Axle, 60¢ & 70¢
 Roller Bearing, 70¢

Griffin Mfg. Co.:
 Solid Axle, No. 10, \$12.00, 60¢ & 70¢
 Roller Bearing, No. 11, \$15.00, 60¢ & 70¢

Roller Bearing, Ex. Hy., No. 10, \$18.00, 60¢ & 70¢
 Bull Dog, \$24.00, 70¢

Lane Bros. Co.:
 Parlor, Ball Bearing, \$4.00;
 Standard, \$3.15; No. 105, \$2.85;
 New Model, \$2.80; New Champion per set of 4 Hangers, complete with track, \$2.25

Barn Door, Standard, 60¢ & 70¢
 Hinged, 60¢ & 70¢
 Covered, 60¢ & 70¢
 Special, 70¢ & 80¢
 Trolley Hangers and track, 50¢

Lawrence Bros.:
 Cleveland, 70¢ & 75¢
 Clipper, No. 75, 60¢
 Anti-Friction, 60¢ & 70¢
 Cyclone, No. 40, 60¢ & 70¢
 Tandem, No. 50, 60¢ & 70¢
 New York, 55¢ & 60¢
 Trolley, No. 30, 1/2 pair, \$1.25

McKinney Mfg. Co.:
 Roller Bearing, Nos. 1 and 2, 70¢
 Anti-Friction, 60¢
 Hinged Hangers, King Charm, 60¢

Richards Mfg. Co.:
 Hangers, Nos. 47, 48, 147, 247, 60¢ & 70¢
 Pioneer Wood Track, No. 3, \$2.25
 Roller B'g St'l Track No. 12, \$2.20
 Roller B'g St'l Track No. 13, \$2.50
 Roller B'g, Nos. 39, 41, 70¢ & 75¢

Hero, Adj. Track No. 19, 50¢ & 60¢
 Adjustable Track Tandem Trolley Track No. 16, 50¢ & 60¢
 Seal, Steel Track No. 8, \$2.25
 Auto Adj. Track No. 22, 50¢ & 60¢
 Trolley B. D. No. 17, \$1.25; F. D. No. 120, \$2.25; No. 121, \$2.45; No. 150, \$2.50

Salty Underwriters F. D. No. 101, 50¢
 Tandem No. 44, 2 1/2 and 3 60¢ & 70¢
 Palace, Adjustable Track No. 132, 50¢ & 60¢
 Royal, Adjustable Track No. 122, 50¢ & 60¢

Ives Wood Track No. 1, \$2.25
 Trolley B. D. No. 20, 50¢ & 60¢
 Trolley B. D. No. 21, \$1.30; No. 27, \$1.40; No. 28, \$1.60

Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2, 70¢ & 75¢
 Anti-friction, No. 42, No. 44, Sizes 2 and 3, 60¢ & 70¢
 Hinged Tandem No. 48, 60¢ & 70¢
 Folding Door B. B. Swivel No. 135, 40¢

Taylor & Roggie's Fy Co.'s Kidder's Roller Bearing, 1/2 doz., 4 in., \$12.00; 5 in., \$14.00, 40¢ & 50¢
 Myers' Stayon Hangers, 60%

Hangers— Garment—

Pullman Trouser, 1/2 gro., No. 1 \$9.00; No. 4, \$24.00; No. 5, \$16.50; No. 8, Black Enamel, \$7.50; No. 10, \$21.00; No. 12, \$8.00; No. 15, Rods, \$9.00; No. 18, Loops, \$10.00

Victor Folding, 1/2 gro. \$9.60

Gate—

Myers' Patent Gate Hangers, 1/2 doz., net, 50%

Joist and Timber—

Lane Bros. Co., 33%

Hasps—

Griffin's Security Hasp, 50¢ & 60¢
 McKinney's Perfect Hasp, 1/2 doz., 60%

Hatchets—

Regular list, first qual. 40¢ & 45¢ @—
 Second quality, 50¢ & 55¢ @—

Heaters, Carriage—

Clark, No. 5, \$1.25; No. 5B, \$1.50; No. 3, \$1.75; No. 3D, \$2.00; No. 7D, \$2.25; No. 3E, \$2.50; No. 1, \$3.00, 25¢
 Clark Coal, 1/2 doz., \$0.75, 20%

Hinges—

Blind and Shutter Hinges
 Surface Gravity Locking Blind:
 Doz. Sets with Fastenings, No. 1, \$0.70; No. 3, \$1.25; No. 5, \$2.65

Mortise Shutter, 80¢
 Mortise Reversible Shutter, 80¢
 North's Automatic Blind Pictures, No. 2, for Wood, \$9.00; No. 3, for Steel, \$15.00
 Charles Parker Co., 70¢ & 75¢
 Parker Wire Goods Co., 70¢ & 75¢
 Hale & Benjamin Automatic Blind Hinges, 20¢
 Hale's Blind Awning Hinges, No. 110, for wood, \$9.00; No. 111, for brick, \$9.00, 20%

Reading's Gravity.....00%

Stanley's Steel Gravity Blind Hinges, No. 1647 1/2, 1/2 doz. sets, without screws, \$0.35; with screws, \$1.25

Wrightsville Hardware Co.:
 O. S. Lull & Porter, 75¢ & 80¢
 Acme, Lull & Porter, 75¢
 Queen City Reversible, 75¢
 Shepard's Noiseless, Nos. 60, 65, 75, 75¢ & 80¢

Niagara, Gravity Locking, Nos. 1, 3 & 5, 75¢ & 80¢
 Clark's O. P. No. 1, 75¢ & 80¢
 Clark's O. P. Nos. 3 and 5, 75¢ & 80¢
 Tip Pat'n, No. 1, 75¢ & 80¢
 Clark's No. 3, 75¢ & 80¢
 Buffalo Gravity Locking, Nos. 1, 3 & 5, 70¢ & 80¢

Shepard's Double Locking, 75¢
 Champion Gravity Locking, 75¢ & 80¢
 Pioneer, 75¢ & 80¢
 Empire, 65¢
 W. H. Co.'s Mortise Gravity Locking, No. 2, 60¢ & 70%

Gate Hinges—

Clark's or Shepard's—Doz. sets:
 No. 1 2 3
 Hinges with Latches, \$2.00 2.70 5.00
 Hinges only, 1.25 1.90 3.50
 Latches only, .70 .75 .35

New England:
 With Latch, doz., \$2.00
 Without Latch, doz., \$1.60

Reversible Self-Closing:
 With Latch, doz., \$1.75
 Without Latch, doz., \$1.35

Western:
 With Latch, doz., \$1.75
 Without Latch, doz., \$1.15

Wrightsville Hardware Co.:
 Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, No. 1, 2 or 3, 70%

Miscellaneous—

Griffin Mfg. Co. Flour de Lis Surface Hinges, 1/2 doz. prs., \$1.00

Pivot Hinges—

Bommer Bros. Pivot, Ball Bearing, 40¢
 Lawson Mfg. Co. Matchless, 30%

Spring Hinges—

Holdback, Cast Iron, \$6.75 & \$7.00
 Non-Holdback, Cast Iron, \$6.50 & \$6.75

J. Bardsley:
 Bardsley's Non-Checking Mortise Floor Hinges, 40¢
 Bardsley's Patent Checking, 33%

Bommer Bros.:
 Spring Butt Hinges, 40¢
 Surface Floor, Ball Bearing, 40¢
 Mortise Floor, Ball Bearing, 40¢
 Lavatory Hinges, 40¢

Hoes— Eye—
Scovill and Oval Pattern.
 60&10@60&10&10%
 Grub, list Feb. 23, 1899.
 70&10@70&10&10%
 D. & H. Scovill.....27%
 Ann. Fork & Hoe Co. (Scovill Pat-
 tern).....60&5%

Handled—
 Cronk's Weeding, No. 1, \$2.00; No. 2, \$2.50
 Star Double Bit.....\$2.50
 American Fork & Hoe Co.:
 Regular, Cotton.....75&10&5&2%
 Crescent, Cultivator.....75&2%
 Mattock, Senior.....70%
 Mattock, Junior.....70%
 Sprouting.....50%
 Tobacco, Harper's.....67%&15&10%
 Warren.....55&1&10&5%
 Ivanhoe.....65&15&10%
 Cultivator, B B 6.....70&10&10&5%
 Cultivator, B B 6 1/2.....70&10&10&5%
 Weeding, Acme.....72%&10&2%
 Scuffle, Lightning.....60&5%

Hoisting Apparatus—
 See Machines, Hoisting.

Holders— Bit—
 Angular, # doz, \$21.00.....45&10%

Door—
 Bardsley's, Iron, 40%: Brass and
 Bronze.....25%
 Empire.....50%
 Pullman.....25%
 Richards Mfg. Co.: No. 117, Ever-
 ready, 40%: Nos. 118, 119, Sure
 Grip.....50%
 Superior.....35%

File and Tool—
 Nicholson File Holders and File
 Handles.....35%&40%

Fruit Jar—
 Triumph Fruit Jar Holder, # gross,
 \$18.00; # doz.....\$2.00

Trace and Rein—
 Fernald Double Trace Holder, # doz,
 pairs.....\$1.25
 Dash Rein Holder, # doz.....\$1.25

Hones—Razor—
 Pike Mfg. Co., Belgian and Swat,
 50%: German.....35%&5%

Hooks—Cast Iron—
 Bird Cage, Reading.....40%
 Clothes Line, Reading List.....40%
 Coat and Hat, Reading.....45&20%
 Coat and Hat, Wrightsville.....60&5%
 Harness, Reading List.....40%

Wire—
 Belt, Nos. 1 to 15.....75&10@80%
 Wire U. & H. Hoos.....80@80&10%
 Bradley Metal Clean Wire, Coat and
 Hat, 75&10@80%: Ceiling, 75&10@80%
 Columbian Hd. Co., Gem.....75&10%
 Parker Wire Goods Co., King.....75&10%
 Wire Goods Co.:
 Acme, 60&10%: Chief, 70&10%
 Crown, 75%: Clear, 65&10%
 Brace, 75%: Clear Harness, 60%
 Ceiling, 75%

Wrought Iron—
 Box, 6 in., per doz., \$0.90; 8 in.,
 \$1.15.
 Cotton.....dos. \$1.25@1.50
 Wrought Staples, Hooks, &c.,
 See Wrought Goods.

Miscellaneous—
 Hooks, Bench, see Steps, Bench.
 Bush, Light, doz., \$6.20; Medium,
 \$6.75; Heavy, \$7.65
 Grass, best, all sizes, per doz.,
 \$2.75@3.00
 Grass, common grades, all sizes,
 per doz.....\$1.25@1.50
 Whiffletree.....lb. 5%@6%
 Hooks and Eyes:
 Brass.....60@60&10%
 Malleable Iron.....70@70&10%
 Covert Mfg. Co. Gate and Scuttle
 Hooks.....40%
 Turner & Stanton Co. Cup and
 Shoulder.....65&10%
 Bench Hooks—See Bench Steps.
 Corn Hooks—See Knives, Corn.

Horse Nails—
 See Nails, Horse.

Horseshoes—
 See Shoes, Horses.

Hose, Rubber—
 Garden Hose, 3/4-inch:
 Competition.....ft. 60@40%
 3-ply Guaranteed.....ft. 8%
 4-ply Guaranteed.....ft. 9%
 Cotton Garden, 3/4-in., coupled:
 Low Grade.....ft. 8@9%
 Fair Quality.....ft. 10@11%

Irons— Sad—
 From 4 to 10.....lb. 2%
 B. B. Sad Irons.....lb. 3%
 Mrs. Potts', cents per set:
 Nos. 50 55 60 65
 Jap'd Caps.....86 93 96 93
 Tin'd Caps.....91 88 1.01 98
 New England Pressing.....lb. 3%
 Bar and Corner—
 Richards Mfg. Co., Bar, 60&10%:
 Corner.....60%

Pinking—
 Pinking Irons.....dos. 60@65%

Irons, Solde-ing
 See Coppers.

Jacks, Wagons—
 Covert Mfg. Co.:
 Auto Screw.....30&2%: Steel, 45%
 Lockport.....50%
 Lane's Steel.....30&5%
 Richards' Tiger Steel, No. 130.....50&10%
 Smith & Hemenway Co.'s.....35%

Ladder—
 Richards Mfg. Co., Ladder Jacks.....30%

Jointers—
 Pike Mfg. Co., Saw Jointers, \$7.00. 40%

Kettles—
 Brass, Spun, Plain.....20@25%
 Enameled and Cast Iron—See Ware,
 Hollow.

Knives—
 Butcher, Kitchen, &c.—
 Foster Bros.' Butcher, &c.....30%
 Wilkinson Shear & Cutlery Co.....60%

Corn—
 Columbian Cutlery Co., Wilcutt
 Brand Knives and Hooks.....60%
 American Fork & Hoe Co.:
 Easy Cut, # doz., No. 10 C H.....\$2.10
 Easy Cut, # doz., No. 10 B C H.....\$2.20
 Acme, # doz.....\$2.35
 Dent, # doz.....\$2.35
 Adjustable, Serrated, # doz.....\$1.90
 Serrated, # doz.....\$1.85
 Yankee, No. 1 C H.....\$1.35
 Yankee, No. 2 C H.....\$1.15

Drawing—
 Standard List.....80&10@—%
 C. E. Jennings & Co., Nos. 45, 46,
 25&7%
 Jennings & Griffin, Nos. 41, 42,
 66%&7%
 Swan's.....66%&70%
 Watrous.....16%
 L. & I. J. White.....20&5&25%

Hay and Straw—
 Serrated Edge, per doz. \$5.00@5.50
 Iwan's Sickle Edge.....# doz. \$0.50
 Iwan's Serrated.....# doz. \$10.00

Miscellaneous—
 Farriers'.....doz. \$2.60@3.57
 Wostenholm's.....# doz. \$3.00@3.25

Knobs—
 Base, 2 1/2-inch, Birch or Maple,
 Rubber Tip.....gro. \$1.25@1.40
 Carriage, Jap., Drive, all sizes,
 gro. 35@40¢
 Door, Mineral.....doz. 65@70¢
 Door, Por. Jap'd.....doz. 70@75¢
 Door, Por. Nickel.....doz. \$2.05@2.15
 Bardsley's Wood Door, Shutters, &c. 15%

Lacing, Leather—
 See Belting, Leather

Ladders, Store, &c.—
 Lane's Store.....25%
 Myers' Noiseless Store Ladders.....50%
 Richards Mfg. Co.:
 Improved Noiseless, No. 112.....50%
 Climax Shelf, No. 113.....50%
 Trolley, No. 109.....50%

Ladies, Melting—
 L. & G. Mfg. Co., Melting and
 Plumbers'.....25%
 P. S. & W.....40&10%
 Reading.....60%

Lamps—
 Hammer's M. I. Hand.....45%

Lanterns—Tubular—
 Regular, No. 0.....doz. \$4.35@4.50
 Side Lift, No. 0.....doz. \$4.60@4.75
 Hinge Globe, No. 0.....doz. \$4.60@4.75
 Other Styles.....40@40&10%

Bull's Eye Police—
 3-inch.....\$3.75@4.00

Latches— Thumb—
 Roggin's Latches, Jap'd, with
 Screws.....doz. 35@40¢

Door—
 Cronk & Carrier Mfg. Co., No. 101,
 122.....# doz. \$2.00
 Richards' Bull Dog, Heavy, No.
 122.....50&5%
 Richards' Trump, No. 127.....\$4.33

Leaders, Cattle—
 Small.....doz. 50¢; large, 60¢
 Covert Mfg. Co.:
 Cotton, 45%: Hemp, 45%: Jute,
 35%: Sisal, 20%.

Leathers, Pump—
 See Pumps—

Lifters, Transom—
 R. & E.....10%

Lines—
 Wire Clothes, Nos. 13 19 20
 100 feet.....\$2.30 1.95 1.75
 75 feet.....\$1.95 1.65 1.50
 Samson Cordage Works:
 Solid Braided Chalk, Nos. 0 to 3, 40%
 Solid Braided Mason's.....30%
 Silver Lake Braided Chalk, No. 0,
 \$6.00; No. 1, \$6.50; No. 2, \$7.00; No.
 3, \$7.50.....# gr. 20%
 Mason's Lines, Shade Cord, &c.:
 White Cotton, No. 3 1/2, \$1.50; No. 4,
 \$2.00; No. 4 1/2, \$2.50; Colors, No. 3 1/2,
 \$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75;
 Linen, No. 3 1/2, \$2.50; No. 4, \$3.50;
 No. 4 1/2, \$4.50.....20%
 Tent and Awning Lines: No. 5,
 White Cotton, \$7.50; Drab Cotton,
 \$8.50.....20%
 Clothes Lines, White Cotton: 50 ft.,
 \$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75
 ft., \$4.00; 80 ft., \$4.25; 90 ft., \$4.75;
 100 ft., \$5.25.....20%
 Turner & Stanton Co.:
 Solid Braided Chalk, Mason's and
 Awning Lines.....40%
 Clothes Lines, White Cotton.....20%
 Shade Cord, Cotton or Linen.....20%

Locks— Cabinet—
 Cabinet Locks.....35 1/2@37 1/2@35%

Door Locks, Latches, &c —
 NOTE—Net Prices are very often made
 on these goods.

Reading Hardware Co.
 R. & E. Mfg. Co.....10%

Padlocks—
 R. & E. Mfg. Co. Wrought Steel and
 Brass.....75&10%

Sash, &c.—
 Ives' Patent:
 Crescent.....10%
 Automatic Gravity Metal Sash, #
 gro., \$19.50.....10%
 Window Ventilating.....10%
 Pullman Patent Ventilating Lock.....25%
 Reading Sash Locks.....40%
 Taylor Mfg. Co., Perfect Ventilating,
 # doz.....\$4.75@5.10

Machines—Boring—
 Com. Up'r't, without Augers.....\$2.00@2.25
 Com. Ang'l'r, without Augers.....\$2.25@2.50

Ford Auger Bit Co.
 Jennings, Nos. 1 and 4.....25&7 1/2%
 Millers' Falls.....5.75
 Snell's, Upright, \$2.65; Angular, \$2.90
 Swan's Improved.....10&10%

Corking—
 Reisinger Invincible Hand Power.....
 # doz. \$48.00

Fence—
 Williams' Fence Machines.....each, \$5.50

Hoisting—
 Moore's Anti-Friction Chain Hoist.....30%
 Moore's Hand Hoist, with Lock
 Brake.....20%
 Moore's Cyclone High Speed Chain
 Hoist.....25%

Ice Cutting—
 Chandler's.....12 1/2%

Washing
 Boss Washing Machine Co.: Per doz.
 Boss No. 1.....\$57.00
 Boss Rotary.....\$57.00
 Champion Rotary Banner No. 1.....\$57.00
 Standard Champion No. 1.....\$50.00
 Standard Perfection.....\$27.00
 Cincinnati Square Western.....\$33.00
 Uneda American, Round.....\$33.60

Mallets—
 Hickory.....45&45@50%
 Lignumvitte.....45&45@50%
 Tinnern's Hickory and Apple-
 wood.....doz. 45&45@50%

Mangers, Stable—
 Sweet Iron Works.....50%

Mats, Door—
 Acme Flexible Steel.....50%
 Elastic Steel (W. G. Co.), new list.....50%

Mattocks—
 See Picks and Mattocks.

Milk Cans—See Cans, Milk.

Mills, Coffee, &c.—
 Enterprise Mfg. Co.:
 Coffee.....20@25%
 Shell and Corn.....25&10%
 National list Jan. 1, 1902.....30%
 Parker's Columbia and Victoria.....35%
 Parker's Box and Side.....50&10%
 Swift, Lane Bros. Co.....30%

Motors, Water—
 Divine's Red Devil.....30%
 \$2.50 3.50 10.00 15.00.....33 1/2%
 No. 1 2 3 4
 Lippincott's:
 No.....1 2 3 4
 \$2.50 3.50 10.00 15.00.....33 1/2%
 Pike Mfg. Co., Tool and Knife
 Grinding.....33 1/2%

Mowers, Lawn—
 NOTE—Net prices are generally quoted
 Cheapest, 10-in., \$2.00; advance
 10¢ for each size.
 Cheap, 10-in., \$2.25; advance 15¢
 20¢ for each size.
 Better Grade, 10-in., \$3.00; ad-
 vance 25¢ for each size.
 12 14 16 18 in.
 High Grade.....\$1.50 4.75 5.00 5.25
 Continental.....60%
 Great American.....70%
 Great American Ball B'rg, new list.....70%
 Quaker City.....70%
 Pennsylvania.....60%
 Pennsylvania, Jr., Ball Bearing.....50&10&5%
 Pennsylvania Golf.....50%
 Pennsylvania Horse.....33%&5%
 Pennsylvania Pony.....40&5%

Nails—
 Wire Nails and Brads, Miscel-
 laneous.....85&45@85&10%
 Cut and Wire. See Trade Report.
 Hungarian, Finishing, Upholster-
 ers', &c. See Tacks.

Horse—
 Nos. 6 7 8 9 10
 Anchor.....23 21 20 19 18.....# lb. net, 12¢
 Coleman.....13 12 11 11 11.....# lb. net, 12¢
 New Haven.....23 21 20 19 18.....# lb. net, 12¢
 Livingston.....19 18 17 16 16.....# lb. 10%
 Western.....# lb. 8 1/2¢
 Jobbers' Special Brands,
 per lb. 9¢

Picture—
 1 1/2 2 2 1/2 3 in.
 Brass Hd. gro. .45 .55 .60 .70
 Por. Head, gro. .1.10 1.10 1.10

Upholsters—
 Brass.....30%
 Plated.....30&10%

Nippers—
 See Pliers and Nippers.

Nipples—
 Standard Nipple Co.:
 Wrought Pipe Nipples.....80%

Nuts— Blank or Tapped.

Cold Punched: Off list.
 Square.....5.60¢
 Hexagon.....6.20¢
 Square, C. T. & R.....6.00¢
 Hexagon, C. T. & R.....6.90¢

Hot Pressed:
 Square.....6.10¢
 Hexagon.....6.60¢

Oakum—
 Best.....lb. 6 1/2¢
 U. S. Navy.....lb. 6¢
 Navy.....lb. 5¢
 Plumbers' Spun Oakum.....2%@3¢

Oil—
 Pike Mfg. Co., Stonoil.....40%

Oil Tanks—See Tanks, Oil.

Oilers—
 Steel, Copper Plated.....75%
 Chase or Paragon:
 Brass and Copper.....50&10%
 Zinc.....65&10@70%
 Railroad.....60&10&10%
 Malleable, Hammers' Improved, Nos.
 11, 12 and 13, 10%: Old Pattern,
 Nos. 1, 2, 3, 4, 50%
 American Tube & Stamping Co.:
 Spring Bottom Cans.....70@70&10%
 Railroad Oilers, &c.....60@60&10%
 Maple City Mfg. Co.:
 Spring Bottom Cans.....70@70&10%
 Railroad Oilers, &c.....60@60&10%

Openers—Packing Box—
 Hercules, # doz., \$21.....30%

Can Openers—
 Sprague, Iron Handle.....30@35¢
 Sprague, Wood Handle.....40¢
 Sardinia Scissors.....\$1.75@3.00

Can and Bottle Openers, # doz.,
 net: Yankee, \$0.75@0.85; Little
 Gem, \$0.50@0.65; Nifty.....\$0.75

Egg—
 Hartigan Nickel Plate, # doz., \$2.00;
 Silver Plate, \$4.00.

Packing—
 Asbestos Packing, Wick and
 Rope, any quantity.....18@20¢

Rubber—
 (Fair quality goods.)
 Sheet, C. I.....11@12¢
 Sheet, C. O. S.....11@12¢
 Sheet, C. B. S.....12@13¢
 Sheet, Pure Gum.....40@45¢
 Sheet, Red.....40@50¢
 Jenkins' '96, # lb, 80¢.....25%

Miscellaneous—
 American Packing.....lb. 7@10¢
 Cotton Packing.....lb. 16@25¢
 Italian Packing.....lb. 9@10¢
 Jute.....lb. 4@4 1/4¢
 Russia Packing.....lb. 9@10¢

Pails, Water, Well, &c.—
 See Buckets.

Paint—
 Dixon's Silica-Graphite, in 1 gal.
 pails and 5 gal. kegs, 25%: pack-
 ages of larger size.....20%

Pans— Dripping—
 Standard List.....75&10@80%
 Edwards, Royal Blue.....75%

Fry—
 Common Lipped:
 Nos.....1 2 3 4 5
 Per doz.....\$0.75 0.85 0.95 1.15 1.30

Refrigerator, Galva.—
 Inch.....12 14 16 18
 Per doz.....\$1.75 2.25 2.80 3.15

Paper—Building Paper
 Asbestos.....lb.
 Roll Board or Building Felt,
 6 to 30 lb., per 100 sq. ft.....2 1/2¢
 Roll Board or Building Felt,
 3-32 and 1/2 in., 45 to 60 lb.,
 per 100 sq. ft.....3 1/2¢
 Mill Board, Sheet, 40 x 40 in.,
 1-32 to 1/2 in.....3¢
 Per roll.
 Rosin Sized Sheathing: 500 sq. ft.
 Light weight, 25 lbs. to roll,
 48@58¢
 Medium weight, 30 lbs. to roll,
 56@70¢
 Heavy weight, 40 lbs. to roll,
 75@78¢

Black Water Proof Sheathing,
 500 sq. ft., 1 ply, 65¢; 2 ply,
 85¢; 3 ply, \$1.10; 4 ply, \$1.25.
 Deafening Felt, 9, 6 and 4 1/2 sq.
 ft. to lb., ton.....\$53.50
 Red Rope Roofing, 250 sq. ft.
 per roll.....\$1.75

Tarred Paper—
 1 ply (roll 400 sq. ft.), ton,
 \$33.00@38.00
 2 ply, roll 108 sq. ft.....65¢
 3 ply, roll 108 sq. ft.....88¢
 Slater's Felt (roll 500 sq. ft.).....80¢

Sand Paper and Cloth—
 Flint and Emery.....50&10%
 Gornet Paper and Cloth.....25%

Parers—Apple—
 Goodell Co.:
 Family Bay State.....# doz. \$15.00
 Improved Bay State.....# doz. \$36.00
 New Lightning.....# doz. \$7.00
 Turn Table '98.....# doz. \$6.00
 White Mountain.....# doz. \$5.00
 Romanza Improved.....each \$7.50
 Dandy.....each \$10.00
 Eureka Improved.....each \$20.00
 New Century.....each \$20.00
 Ranger.....each \$30.00

Livingston Nail Co.:	doz.	\$4.00
Daisy	doz.	\$5.00
Little Star	doz.	\$6.20
Reading Hardware Co.:		
Advance	doz.	\$1.00
Baldwin	doz.	\$1.00
Reading 72	doz.	\$3.25
Reading 78	doz.	\$6.25

Orange—

Goodell Co., Success.	each	\$20.00
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Potato—

Saratoga	doz.	\$7.50
White Mountain	doz.	\$6.00

Picks and Mattocks—

(List Jan., 1908.)

List	70¢@10¢@70¢@10¢@10%
Crank's Handled Garden Mattock,	
per doz., \$3.00.....	33½%

Pinking Irons—

See Irons, Pinking.

Pins, Escutcheon—

Brass	50¢@50¢@10%
Iron, list Nov. 11, '85.	60¢@60¢@10%

Pipe, Cast Iron Soil—

Standard, 2-6 in.	70¢@10%
Extra Heavy, 2-6 in.	75¢@10¢@80%
Fittings, Standard and Heavy,	80¢@10¢@85%

Pipe, Merchant—Consumers, Carloads,
Steel. Iron.
Blk. Galv. Blk. Galv.

1/4 and 1/2 in.	66	50	64	52
3/4 in.	68	54	66	52
1 in.	70	58	68	56
3/4 to 6 in.	74	64	72	62
7 to 12 in.	71	56	69	54

Pipe, Vitrified Sewer—

Carload lots.

Standard Pipe and Fittings, 3	
to 2 1/2 in., f.o.b. factory:	
First-class	87%
Second-class	90%

Pipe, Stove—

Edwards' Nested:	Per 100 joints.	C. L. L. C. L.
5 in., Standard Blue	\$6.25	\$7.25
6 in., Standard Blue	6.75	7.75
7 in., Standard Blue	7.75	8.75
5 in., Royal Blue	7.00	8.00
6 in., Royal Blue	7.50	8.50
7 in., Royal Blue	8.50	9.50
Wheeling Corrugating Co.'s Nested:		
5 in., Uniform Color	\$5.90	
6 in., Uniform Color	6.40	7.40
7 in., Uniform Color	7.40	8.40

Planes and Plane Irons—

Wood Planes—

Bench, first qual.....	30@30&10%
Bench, second qual.....	40@40&10%
Molding	25@25&10%
Chapin-Stephens Co.:	
Bench, First Quality.....	30%
Bench, Second Quality.....	40%
Molding and Miscellaneous.....	25%
Toy and German.....	30%
Union	60%

Iron Planes—

Chaplin's Iron Planes.....	60%
Union	60%
Plane Irons—	
Wood Bench Plane Irons, list	
Dec. 12, '06.....	25%
Buck Bros.....	30%
Chapin-Stephens Co.....	25%
Union	50%
L. & J. J. White.....	20¢ & 25¢

Planters, Corn, Hand—

Kohler's Eclipse	doz.	\$7.50
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Plates—

Felloe	lb.	3¢@4¢
Avery Stamping Co.:		
Standard Wrot. Steel Felloe Plates		
in 100 lb kegs, per 100 lb, ¾-in. to		
1½-in., \$4.00 net; 1½-in. to 2-in.,		
inclusive, \$3.75 net.		

Steel Pipe Hook—

Never-Break	75¢@10%
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Pliers and Nippers—

Button Pliers	75¢@75¢@10¢@5%
Gas Burners, per doz., 5 in., \$1.25	
@\$1.30; 6 in., \$1.45, \$1.50.	
Gas pipe, 7 8 10 12-in.	\$2.00 \$2.25 \$2.75 \$3.50
Acme Nippers	50¢@5%
Cronk & Carrier Mfg. Co.:	
American Button	80%
Improved Button	75¢@10%
Cronk's	60%
No. 80 Linemen's	50%
Stub's Pattern	45%
Combination and others	33½%
Heller's Farriers' Nippers, Pincers	40¢@40¢@10¢@5%
P. S. & W. Tinnors' Cutting Nippers	40%
Swedish Slide, End and Diagonal	50%
Cutting Pliers	50%
Utica Drop Forge & Tool Co.:	
Pliers and Nippers, all kinds	40%

Plumbs and Levels—

Chapin-Stephens Co.:	
Plumbs and Levels	30¢@30¢@10%
Chapin's Imp. Brass Cor.	40¢@40¢@10%
Pocket Levels	30¢@30¢@10%
Extension Sights	30¢@30¢@10%
Machinists' Levels	40¢@40¢@10%
Dinon's Plumb and Levels	60¢@10%
Dinon's Pocket Levels	60¢@10%
Stanley's Duxes	35%
Woods' Extension	33½%

Points, Glaziers—

Bulk and 1-lb. papers	lb.	9¢
1/2-lb. papers	lb.	9½¢
1/4-lb. papers	lb.	11¢

Police Goods—

Manufacturers' Lists	25¢@25¢@5%
Tower's	25%

Polish—Metal, Etc—

Ladd Co.	
Putzade Liquid, ½ gro., ½ pts.,	
\$12.00; 1 pts., \$20.00; 1 qts., \$40.00;	
½ doz., ½ gals., \$6.35; 1 gals., \$12.00.	
Prestoline Liquid, No. 1 (¼ pt.)	
doz., \$3.00; No. 2 (½ qt.), \$9.00; 10%	
Prestoline Paste	doz., 40%
George William Hoffman:	
U. S. Metal Polish Paste, 3 oz.	
boxes, ½ doz., 50¢; 1 doz., \$4.50;	
½ lb boxes, ½ doz., \$1.25; 1 lb	
boxes, ½ doz., \$2.25.	
U. S. Liquid, 8 oz. cans, ½ doz.,	
Barkeepers' Friend Metal Polish, ½	
doz., \$1.75.	

Stove—

Black Eagle Benzine Paste, 5 lb cans,	doz.	\$10.00
Black Eagle, Liquid, 1/2 pt. cans,	doz.	75¢
Black Jack Paste, 1/2 lb cans, doz.		\$0.75
Black Kid Paste, 5 lb can, each, \$0.65		
Ladd's Black Beauty Liquid, per	100 tins.	\$6.75
Joseph Dixon, doz.	\$5.75	10%
Dixon's Plumbago	doz.	\$1.50
Fireside	doz.	\$2.50
Gem, doz.	\$1.50	10%
Japanese	doz.	\$3.50
Jet Black	doz.	\$3.50
Peerless Iron Enamel, 10 oz. cans,	doz.	\$1.50

Window Polish—

Benj. P. Forbes:	
Glasbright, No. 2, gal pails, 30 doz.,	
\$24.00; each, \$2.50; 1 lb cans,	
each	75¢
Glasbright Powder, bbls., 30 lb..	20¢

Poppers, Corn—

1 qt. Square	doz.	\$0.80; gro. \$3.75
1 qt. Round	doz.	\$0.90; gro. \$10.00
1 1/2 qt. Square	doz.	\$1.20; gro. \$12.00
2 qt. Square	doz.	\$1.50; gro. \$15.00

Post Hole and Tree Augers and Diggers—

See also Diggers, Post Hole, &c.	
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Posts, Steel—

Steel Fence Posts, each, 6 ft., 46¢ ;	
6½ ft., 48¢ ; 7 ft., 50¢ .	
Steel Hitching Posts.....each	\$1.30

Potato Parers—

See Parers, Potato.

Pots, Glue—

Enameled	40%
Tinned	30¢@10%

Powder—

In Canisters:		
Duck, 1 lb.	each	45¢
Fine Sporting, 1 lb.	each	75¢
Rifle, 1/2 lb.	each	14¢
Rifle, 1 lb.	each	25¢
In Kegs:		
25-lb. kegs.		\$3.50
25-lb. kegs.		\$4.60
King's Semi-Smokeless:		
Keg (25 lb bulk)		\$6.50
Half Keg (12 1/2 lb bulk)		\$3.50
Quarter Keg (6 1/4 lb bulk)		\$1.90
Case 24 (1 lb cans bulk)		\$8.50
Half case (1 lb cans bulk)		\$4.50
King's Smokeless:		
	Shot Gun, Rifle,	
Keg (25 lb bulk)		\$12.00 \$15.00
Half Keg (12 1/2 lb bulk)		6.25 7.75
Quarter Keg (6 1/4 lb bulk)		3.25 4.00
Case 24 (1 lb cans bulk)		14.00 17.00
Half case 12 (1 lb c. bk.)		7.25 8.75

Presses—

Fruit, Wine and Jelly—	
Enterprise Mfg. Co.	20¢@25%

Seal Presses—

Morrill's No. 1, doz.	\$20.00	50%
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Pruning Hooks and Shears

See Shears.	
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Pullers, Nail, Etc.—

Pearson No. 1, Cyclone Spike Puller,	each	\$30.00	50%
The Scranton Co., Case Lots:			
No. 2B (large)	doz.	\$5.50	50%
No. 3B (small)	doz.	\$5.00	50%
Smith & Hemenway Co.:			
Diamond B.	doz.	70%	
Giant	doz.	50%	
Staple Pullers, Utica and Davi-			
son	doz.	60%	
Taylor Mfg. Co., Sampson Tack,	doz.	\$0.40	

Pulleys, Single Wheel—

Inch	.....1½	1¾	2	3
Aviating or Tackle,				
doz.	.....\$0.30	.45	.60	1.00
Hay Fork, Steel or Solid Eye,				
doz., 4 in.,	\$1.25; 5 in.,	\$1.55		
Inch	.....2	2¼	2½	
Hot House, doz.	.....\$0.65	.85	1.20	
Inch	.....1¾	1½	1¾	2
Screw, doz.	.....\$0.16	.19	.23	.30
Inch	.....1¾	2	2¼	2½
Side, doz.	.....\$0.25	.40	.55	.60
Inch1½	1¾	2	2½

Sash Pullers—

Common Frame; Square or Round End, per doz., 1 1/4 and 2 in.	\$17.00
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Auger Mortise, no Face Plate,

per doz., 1 1/4 and 2 in.	20¢@21¢
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American Pulley Co.:

Axle	50¢@10%
Wrought Steel, Eagle	17¢@20¢
Top Notch, Electrically Welded,	
Nos. 3 and 4	19¢
Common Sense	doz. 20¢
Fox-All-Steel, Nos. 3 and 7, 2 in.	
	doz. 50%
Grand Rapids All Steel Noiseless	50%
Niagara, No. 25, 1 1/4 in., 19¢; 2	
in.	20½¢
No. 26 Troy, 1 1/4 in., 14½¢; 2 in.,	16½¢
Star, No. 26, 1 1/4 in., 19¢; 2 in., 20½	
Tackle Blocks—See Blocks.	

Pumps—

Cistern	60%
Pitcher Spout	75¢@75¢@10%
Wood Pumps, Tubing, &c.	50%
Barnes Dbl. Acting (low list) ..	45%
Barnes Pitcher Spout	80%
Contractors' Rubber Diaphragm, No.	
2, B. & L. Block Co.	\$16.00
Daisy Spray Pump	\$6.50
Flint & Walling's Fast Mail Hand	
(low list)	50¢@5%
Flint & Walling's Fast Mail (low	
list)	50¢@5%
Flint & Walling's Tight Top	
Pitcher	80%
National Specialty Mfg. Co., Measur-	
ing, Nos. 2, \$6.00; 3, \$5.50 ..	30%
Myers' Pumps (low list)	
Myers' Power Pumps	
Myers' Spray Pumps	

Pump Leathers—

Plunger and Valve Leathers—Per				
gro.:				
No	1	2	3	4
	\$5.00	6.00	7.00	8.00
Cup Leathers—Per 100:				
Inch . . .	2½	3	3½	4
	\$5.00	7.00	9.00	12.00
				%

Punches—

Saddlers' or Drive, good,	doz.	50¢@75¢
Spring, single tube, good qual-		
ity		\$1.75
Revolving (4 tubes)	doz.	\$3.50
Bemis & Call Co.'s Cast St'l Drive	50%	
Morrill's Nos. 1A, 1A, 1B, 1C,		
1D, \$15.00		50%
Hercules, 1 die, each	\$5.00	50%
Niagara Hollow Punches		40%
Niagara Solid Punches		55¢@10%
Tinnors' Hollow, P. S. & W. Co.	40%	
Tinnors' Solid, P. S. & W. Co.	40%	
doz., \$1.44		40¢@10%

Rail—Barn Door, &c.—

Roll-Barn Door, &c.-	
<i>Sliding Door, Painted Iron,</i> 2 1/2¢@2 1/2¢@4¢	
<i>Sliding Door, Wrought Brass,</i>	
1 1/4 in., lb., 36¢	.....30%
Cronk's:	
Double Braced Steel Rail, 1/2 ft.	2 1/2¢
O. N. T. Rail.....	2 1/2¢@4¢
Griffin's:	
xxx, 100 ft., 1 x 3-16 in.,	\$3.25;
1 1/4 x 3-16 in.,	\$3.75.
Hinged Hanger, 100 ft., 1 x 3-16 in.,	\$3.50; 1 1/4 x 3-16 in., \$4.00.
Lane's:	
Hinged Track, 100 ft.	\$3.45
O. N. T., 100 ft., 1 in.,	\$3.12 1/2;
1 1/4 in., \$3.45; 1 1/2 in.,	\$4.00.
Standard, 1 1/4 in.	100 ft. \$4.00
Lawrence Bros.:	
1 x 3-16 in., 100 ft.,	\$7.50; 1 1/4 x 3-16 in., \$8.75
	.....55¢&7 1/2%
Trolley, No. 301, 1/2 ft.	.....9¢
McKinney's:	
Hinged Hanger Track, 1/2 ft.,	11¢
	60¢&5%
1 x 3-16 Track.....	55¢&7 1/2%
Myers' Staying Track.....	60¢&5%
Richards Mfg. Co.:	
Common, 1 x 3-16 in., \$3.00; 1 1/4 x 3-16, \$3.25; 1 1/2 x 3-16, \$3.50.	
Special Hinged Hanger Rail.....	60¢&10%
Lag Screw Rail, No. 65.....	50%
Gauge Trolley Track, 1/2 ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.	
No. 50.....	60¢@10%
Nos. 61, \$3.00; 62, \$3.25; 63, \$3.50; 64, \$4.00; 45, \$3.25; 46, \$3.50; 49, No. 1, \$3.25; 49, No. 2, \$3.50.	

Rakes—NOTE—Many goods are sold
at net prices.

American Fork & Hoe Co.	
Lawn, $\frac{1}{2}$ doz., No. 24, \$2.50; No.	20
	\$2.25
Fort Madison Blue Head Lawn.....	\$2.75
Cronk's:	
Steel Garden: Champion, $\frac{1}{2}$ doz.,	
12-tooth, \$3.75; 14-tooth, \$4.00; 16-	tooth, \$4.25; 18-tooth, \$4.50; 20-
tooth, \$4.75; 22-tooth, \$5.00; 24-	tooth, \$5.25; 14-tooth, \$3.30; 16-
tooth, \$3.60.	
Victor, 12-tooth, \$2.25; 14-tooth,	\$2.50; 16-tooth, \$2.75.
Queen City Lawn, $\frac{1}{2}$ doz., 20 teeth,	\$2.85; 24, \$3.00.....net
Anticlog Lawn, $\frac{1}{2}$ doz.....	\$4.00
Malleable Garden.....	70¢@10%
Ideal Steel Garden, $\frac{1}{2}$ doz., 12 teeth,	\$15.00; 14, \$16.00; 16, \$18.00.....80%
Kohler's:	
Jumbo Lawn, 36-tooth.....	$\frac{1}{2}$ doz. \$5.00
Lawn Lawn, 20-tooth.....	$\frac{1}{2}$ doz. \$2.85
Lawn Queen, 24-tooth.....	$\frac{1}{2}$ doz. \$3.00
Paragon, 20-tooth.....	$\frac{1}{2}$ doz. \$2.65
Paragon, 24-tooth.....	$\frac{1}{2}$ doz. \$2.75
Steel Garden, 14-tooth.....	$\frac{1}{2}$ doz. \$2.40
Malleable Garden, 14-tooth.....	$\frac{1}{2}$ doz. \$1.75@2.00

Ras

Sausage Stuffers or FillersSee *Stuffers or Fillers, Sausage.***Saw Frames—**See *Frames, Saw.***Saw Sets—See Sets, Saw.****Saw Tools—See Tools, S. w.****Saws—**

Atkins':	
Circular	45%
Band	50@50&10
Butcher Saws	50
Cross Cuts	35
One-Man Cross Cut	40
Narrow Cross Cut	50
Hand, Rip and Panel	35&5
Miter Box and Compass	40
Mulay, Mill and Drag	45
Wood Saws	40&10
Chapin-Stephens Co.:	
Turning Saws and Frames	30@30&10
Diamond Saw & Stamping Works:	
Sterling Kitchen Saws	30&10&10
Disston's:	
Circular, Solid and Ins'ted Tooth	50
Band, 2 to 18 in. wide	60
Band, 1/4 to 1 1/2	60
Crosscuts	45
Narrow Crosscuts	50
Mulay, Mill and Drag	50
Framed Woodsaws	25
Woodsaw Blades	25
Woodsaw Rods, Timmed	15
Hand Saws, Nos. 12, 99, 9, 16, 4100,	
D8, 120, 76, 77, 8	25
Hand Saws, Nos. 7, 107, 107 1/2, 3, 1,	
0, 60, Combination	30
Compass, Key Hole, &c.	25
Butcher Saws and Blades	30
C. E. Jennings & Co.'s:	
Back Saws	16%
Butcher Saws	25&7 1/2
Compass and Key Hole Saws	33 1/4&7 1/2
Framed Wood Saws	25&7 1/2
Hand Saws	12 1/2
Wood Saw Blades	33 1/4&7 1/2
Millers Falls:	
Butcher Saws	15&10
Star Saw Blades	15&10
Massachusetts Saw Works:	
Victor Kitchen Saws	40&10&50
Butcher Saws Blades	35&40
Peace & Richardson's Hand Saws	30
Simonds':	
Circular Saws	45
Crescent Ground Cross Cut Saws	30
One-Man Cross Cuts	40&10
Gang Mill, Mulay and Drag Saws	45
Band Saws	50
Back Saws	25@25&7 1/2
Butcher Saws	35@35&7 1/2
Hand Saws	25@25&7 1/2
Hand Saws, Bay State Brand	45
Compass, Key Hole, &c.	25
Wood Saws	40&7 1/2
Wheeler, Madden & Clemson Mfg.	
Co.'s Cross Cut Saws	50

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A	25%
Disston's:	
Concave Blades	25%
Keystone Blades	30
Hack Saw Frames	30
Simonds, 25%: The Best	35 1/2
Culley	35
C. E. Jennings & Co.'s:	
Hack Saw Frames, Nos. 175, 180	40&7 1/2
Hack Saws, Nos. 175, 180, complete	40&7 1/2
Goodell's Hack Saw Blades	40&10
Griffin's Hack Saw Frames	35&5&10
Griffin's Hack Saw Blades	35&5&10
Star Hack Saws and Blades	15&10
Sterling Hack Saw Blades	30&10&5
Sterling Hack Saw Frames	30&10&10
Sterling Power Hack Saw Machines,	
each, No. 1, \$25.00; No. 2, \$30.00	10
Victor Hack Saw Blades	20
Victor Hack Saw Frames	40
Whitaker Mfg. Co.:	
National Hand Blades, Hand	
Frames, Power Blades	40%

Scroll—

Barnes, No. 7, \$15	25%
Barnes' Scroll Saw Blades	40
Barnes' Velocipede Power Scroll Saw,	
without boring attachment, \$18;	
with boring attachment, \$20	20
Leister, complete, \$10.00	15&10
Rogers, complete, \$3.50 and \$1.00	15&10

Scales—

Union Platform, Plain	\$2.10 @ \$2.10
Union Platform, Stpd.	\$2.20 @ \$2.30
Chatillon's:	
Eureka	25%
Favorite	40
Grocers' Trip Scales	40
The Standard Portables	40
The Standard R. R. and Wag-	
on	50&10

Scrapers—

Box, 1 Handle	doz. \$1.85 @ \$2.10
Box, 2 Handle	doz. \$2.35 @ \$2.50
Ship... Light, \$2.00; Heavy, \$1.50	
Chapin-Stephens Co., Box, 30@30&10	
Richards Mfg. Co., Foot	60%

Screws—Bench and Hand

Bench, Iron, doz., 1 in.	\$2.50 @
2 1/2; 1 1/2; 1 1/4; 1 1/8; 3/4; 1/2	\$1.00 @ \$1.25
Bench, Wood	doz. \$2.00 @ \$2.10
Hand, Wood	doz. \$1.00 @ \$1.10
Chapin-Stephens Co., Hand	70@70&10&2 1/2

Coach, Lag and Hand Rail

Lag, Cone Point	80&10@80&10&5
Coach, Gimlet Point	80@80&10
Hand Rail	doz. \$1.00 @ \$1.10

Jack Screws—

Standard List	doz. \$1.00 @ \$1.10
Millers Falls	50&10&10
Swett Iron Works	70@70

Machine—

Cut Tread, Iron, Brass or	
Bronze:	
Flat Head or Round Head	
Fillister Head	50@50&10
Roller Thread, F. H. or R. H.	40@40&10
Iron	75&10
F. H. or R. H., Brass, Nos.	
8 to 14	65&10

Set and Cap—

Set (Iron)	75&10&7 1/2
Set (Steel), net advance over	
Iron	25%
Sq. Hd. Cap	70&10&7 1/2
Hex. Hd. Cap	70&10&7 1/2
Rd. Hd. Cap	50&7 1/2
Fillister Hd. Cap	60&7 1/2

Wood—

List July 23, 1908.	
Flat Head, Iron	87 1/2@87 1/2
Round Head, Iron	85 1/2@85 1/2
Flat Head, Brass	80 1/2@80 1/2
Round Head, Brass	77 1/2@77 1/2
Flat Head, Bronze	75 1/2@75 1/2
Round Head, Bronze	72 1/2@72 1/2
Drive Screws	87 1/2@87 1/2

Scroll Saws—See *Saws, Scroll.***Scythes—**

Plain Grass, Cutting Edge Pol-	
ished	\$6.25 @ \$6.50
Clipper, Bronzed Web	\$6.50 @ \$6.75
Solid Steel, Web and Backs Pol-	
ished	\$7.00 @ \$7.25
Bush, Wood and Bramble	
Painted	\$6.50 @ \$6.75
Grain, Painted, Cutting Edge	
Polished	\$8.25 @ \$8.50
Clipper Grain, Bronze Web	
	\$8.50 @ \$8.75

Seeders, Raisin—

Enterprise	25@30%
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Sets—Awl and Tool—

Fray's Tool Handles, Nos. 1, \$12;	
2, \$16; 3, \$12	50%
Millers Falls Adj. Tool Handles, No.	
1, \$12; No. 4, \$12; No. 5, \$18	20&10%

Garden Tool Sets—

American Fork and Hoe Co.:	
Rake, Shovel and Hoe, 1/2 doz. sets,	
No. 3 P F	\$7.25

Sets, Nail—

Octagon	gro. \$3.50 @ \$3.75
Buck Bros.	27 1/2%
Mayhew's	1/2 gro. \$9.00
Snell's Corrugated, Cup Pt.	40&10
Snell's Knurled, Cup Pt.	40&10
Victor Knurled, Cup Pt.	1/2 gro. \$7.50

Rivet—

Regular list	75@75&10%
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Saw—

Atkins':	
Criterion	40%
Adjustable	40%
Disston's Star, Monarch and Tri-	
umph	30%
Morrill's No. 1	\$15.00
Nos. 3 and 4, Cross Cut	\$20.00
No. 5, Mill	\$30.00
Nos. 10, 11, 95	\$15.00
No. 1 Old Style	\$10.00
Special	\$16.25
Giant Royal Cross Cut	1/2 doz. \$7.50
Royal, Hand	1/2 doz. \$4.50
Taintor Positive	1/2 doz. \$6.75

Shaving—

Fox Shaving Sets, No. 30	
	1/2 doz., net, \$24.00
Smith & Hemenway Co.'s	75%

Sharpeners, Knife—

Pike Mfg. Co.:	
Fast Cut Pocket Knife Hones,	
1/2 doz.	\$1.50
Mounted Kitchen Sand Stone	
1/2 doz.	\$1.50
Natural Grit Carving Knife	
Hones, 1/2 doz.	\$3.00
Quick Cut Emery Carving	
Knife Hones, 1/2 doz.	\$1.50
Quick Edge Pocket Knife	
Hones, 1/2 doz.	\$2.50

Skate—

Smith & Hemenway Co., Eureka	50%
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Shaves, Spoke—

Iron	doz. \$1.25
Wood	doz. \$2.00
Bailey's (Stanley R. & L. Co.)	45%
Chapin-Stephens Co.	30@30&10
Goodell's, 1/2 doz.	\$9.00

Shears—

Cast Iron	7 8 9 in.
Best	\$16.00 18.00 20.00 gro.
Good	\$13.00 15.00 17.00 gro.
Cheap	\$5.00 6.00 7.00 gro.

Straight Trimmers, &c.

Best quality Jap.	70&10&5
Best quality Nickel	60&10&5
Tailors' Shears	40@40&10
Acme Cast Shears	40@40&5
Heinrich's Tailors' Shears	10
National Cutlery Co.'s Nickel Plated	60&10%
60&10%; Japan Handles	70&10
Columbian Cutlery Co.	
Sheep, 1900 list	30&10&5
Grass	50&10
Horse or Mule	50&10
J. Wiss & Sons Co.:	
Best Quality Jap'd	60&10
Best Quality Nickle	50&10
Tailors'	25%

Tinners' Snips—

Steel Blades	80&10@80&10
Steel Laid Blades	50&10

Acme Cast Snips	40@45&5
Forged Handles, Steel Blades, Ber-	
lin	50%
Heinrich's Snips	40%
Jennings & Griffin Mfg. Co.'s 6 1/2 to	
10 in.	33&4 1/2
National Cutlery Co.'s Forged Steel	
Niagara Snips	40%
P. S. & W. Forged Handles, 2 1/2	
W. R. W.	50%
J. Wiss & Sons Co.:	
Wiss Forged Steel	25%

Pruning Shears—

Cronk's Hand Shears	33 1/4%
Cronk's Wood Handle Shears	33 1/4%
Disston's Combined Pruning Hook	
and Saw, 1/2 doz., \$18.00	25%
Disston's Pruning Hook only, 1/2	
doz., \$12.00	25%
J. T. Henry Mfg. Co.:	
Pruning Shears, all grades	40%
P. S. & W. Co.	40&10
Columbian Cutlery Co.:	
Hedge, Wilcut Brand	60&10
Lawn and Border, Wilcut Brand	
	60&10

Sheaves—Sliding Door—

Reading	40%
R. & E. list	15%

Sliding Shutter—

Reading list	40%
R. & E. list	15%

Shells—Shells, Empty—

Brass Shells, Empty:	
Climax, 10 and 12 gauge	60&5
Club, Rival, 65&5; First Quality	60&5

Paper Shells, Empty:

New Rapid, 10, 12, 16 and 20 gauge.	
	25&10%
Climax, 10 and 12 gauge; Acme and	
Magic, 10, 12, 16 and 20 gauge;	
Ideal, 10, 12, 16 and 20 gauge;	
Leader grade	25&5
Union, League, 10 and 12 gauge,	
Rival grade	25%
New Climax, Defiance, 10, 12, 14,	
16 and 20 gauge; Climax, 14, 16	
and 20 gauge; Monarch, 10, 12, 16	
and 20 gauge; League, Union, 14, 16	
and 20 gauge; Repeater Grade	20%

Shells, Loaded—

Loaded with Black Powder	40%
Loaded with Smokeless Powder,	
medium grade	40&5
Loaded with Smokeless Powder,	
high grade	40&10&10
Union Metallic Cartridge Co.:	
New Club, Black Powders	40%
Nitro Club, Smokeless Powders	40&5
Arrow, Smokeless Powders	40&10&10

Shingles, Metal—Per Sq.

Edwards Mfg. Co.:	
Painted	Galv.
14 x 20	\$1.25 \$6.03
10 x 18	4.50 6.25
7 x 10	4.75 6.50

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:	
Iron	per keg \$4.10
Steel	per keg \$3.85
Burdens', all sizes	1/2 keg \$3.90

Shot—

Drop, up to B	25-lb. bag
Drop, B and larger	\$1.80
Huck	2.65
Chilled	2.65
Dust	2.50

Shovels and Spades—

Association List, Nov. 15, 1902	40%
Avery Stamping Co.	40%

Snow Shovels—

Long Handle	\$2.50 @ \$2.75
Wood and Mall, D Handle	
	\$2.65 @ \$2.90

Sieves and Sifters—

Hunter's Imitation, gro.	\$9.50
Hunter's Genuine, per gro.	\$12.00

Sifters, Ash—

Acme Ball Bearing Sales Co., Acme	
Automatic Ash Sifter, each, \$3.25;	
1/2 doz.	\$39.00

Sieves, Seamless Metallic

Mesh	1 1/2 16 18 20
Iron Wire	\$1.05 1.05 1.10 1.20
Tinned Wire	\$1.15 1.15 1.20 1.30

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.	
Mesh 18, Nested	doz. \$0.90 @ \$0.95
Mesh 20, Nested	doz. \$1.00 @ \$1.05
Mesh 24, Nested	doz. \$1.30 @ \$1.40

Sinks, Cast Iron—

Painted, Standard List:	
12 x 12 to 22 x 36 in.	60%
20 x 24 to 24 x 50 in.	60%
24 x 60 to 24 x 120 in.	30%
Barnes' low list	80%

NOTE—There is not entire uniformity

in lists used by jobbers.

Skeins, Wagon—

Cast Iron	70@75&10
Steel	40@45

Slates, School—

Factory Shipments.	
"D" Slates	50@50&10%

Eureka, Uneexcelled Noiseless..

60&7 tens.

Victor A. Noiseless. 60&4 tens 45%**Slaw Cutters—See Cutters.****Snaps, Harness—**

Covert Mfg. Co.:	
Derby, 25%; Yankee, 30&2%; Yankee	
Roller, 30&2%	
High Grade, 40%; Trojan.....	40%

Scythe Stones—

Pike Mfg. Co., 1907 list:	
Black Diamond S. S.	gro. \$12.00
Lamaille S. S.	gro. \$11.00
White Mountain S. S.	gro. \$9.50
Green Mountain S. S.	gro. \$8.00
Extra Indian Pond S. S.	gro. \$7.50
No. 1 Indian Pond S. S.	gro. \$7.50
No. 2 Indian Pond S. S.	gro. \$5.00
Leader Red End S. S.	gro. \$5.00
Quick Cut Emery	gro. \$10.00
Pure Corundum	gro. \$18.00
Crescent	\$7.00
Emery Scythe Rifles, 2 Coat.	\$8.80
Emery Scythe Rifles, 3 Coat.	\$11.80
Emery Scythe Rifles, 4 Coat.	\$13.20
Balance of 1907 list 33 1/2%	
Lectro (Artificial), 1/2 doz.	\$12.00 33 1/2%
Lightning (Artificial), 1/2 doz.	\$12.00 33 1/2%
Lightning (Artificial), 1/2 doz.	\$18.00 33 1/2%

Stoppers, Bottle—

Victor Bottle Stoppers	gro. \$0.00
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Stops—Bench—

Milners Falls	15&10%
Morrill's, 1/2 doz.	No. 1, \$10.00 . . . 50%
Morrill's, No. 2, \$12.50	50%

Door—

Chapin-Stevens Co.	50&50&10%
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Plane—

Chapin-Stevens Co.	20%
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Straps—Box—

Acme Embossed, case lots.	20&10&10%
Cary's Universal, case lots.	20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points, doz.	55¢
All Steel Socket	doz. \$2.00 @ 25

Excelsior Stretcher and Tack Hammer Combined, 1/2 doz.	\$6.00 . . . 20%
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Stuffers, Sausage—

Enterprise Mfg. Co., Stuffers and	
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Lard Presses	25&25&7 1/2%
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National Specialty Co., Hat Jan. 1,	
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1902	30&5%
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P. S. & W. Co.	40&10&5%
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Sweepers, Carpet—

Per doz.—	
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Bissell Carpet Sweeper Co.:	
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Cyco Bearing Superba, \$36.00;	
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Triumph, \$33.00; Parlor Queen,	
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\$30.00; Elite, \$29.00; Boudoir,	
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\$27.00; American Queen, \$27.00;	
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Ideal, \$25.00; Gold Medal, \$24.00;	
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Primmer, \$24.00; Prize, \$24.00; Wel-	
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come, \$24.00; Grand Rapids,	
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Nickel, \$24.00; Japan, \$22.00;	
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Crystal, \$22.00; Grand, \$22.00;	
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Parlor Grand, \$48.00; Club, \$54.00;	
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Hall, \$60.00; Standard Nickel,	
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\$22.00; Standard Japan, \$20.00;	
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Crown Jewel, Nickel, \$21.00;	
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Crown Jewel, Japan, \$19.00; Junior,	
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Nickel, \$22.00; Junior, Japan,	
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\$20.00.	
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NOTE.—Rebates: 50c per dozen on	
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three dozen lots; \$1 per dozen on five	
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dozen lots; \$2 per dozen on ten dozen	
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lots.	
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Tacks, Finishing Nails,	
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&c.	
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American Carpet Tacks	90¢@40%
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American Out Tacks	90¢@40%
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Suedes' Cut Tacks	90¢@40%
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Suedes' Upholsterers'	90¢@40%
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Gimp Tacks	90¢@50%
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Lace Tacks	90¢@50%
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Trimmers' Tacks	90¢@40%
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Looking Glass Tacks	65%
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Bill Posters' and Railroad Tacks,	
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90¢@50¢@10%	
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Hungarian Nails	80¢@20%
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Finishing Nails	70%
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Trunk and Clout Nails	80¢@10%
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NOTE.—The above prices are for	
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Straight Weights.	
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Miscellaneous—

Double Pointed Tacks,	90¢@6 tens@—%
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Se also Nails, Wire,	
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Tanks, Oil and Gasoline—

Wilson & Friend Co.:	
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Gal. Gasoline	Oil
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30	\$2.75 \$3.00
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60	\$3.50 \$4.00
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110	\$5.00 \$5.75
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Tapes, Measuring—

American Asses' Skin	50¢@—%
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Patent Leather	25¢@30¢@5%
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Steel	3 1/2¢@5%
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Chesterman's	25¢@25¢@5%
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Keuffel & Esser Co.:	
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Favorite, Ass Skin	40¢@10¢@50%
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Favorite, Duck and Leather	25¢@25¢@10%
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Metallic and Steel, lower list, 35¢@	
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35&5%; Pocket, 35¢@35&5%.	
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Lufkins:	
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Asses' Skin	40¢@10¢@50%
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Metallic	30¢@30¢@5%
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Patent Bend, Leather	25¢@25¢@10%
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Pocket	40¢@40¢@5%
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Steel	33 1/2¢@33%
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Wiebusch & Hilger:	
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Chesterman's Metallic, No. 34L,	
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etc.	25%
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Chesterman's Steel, No. 1038L,	
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etc.	33%
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Teeth, Harrow—

Steel Harrow Teeth, plain or	
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headed, 1/2-inch and larger,	
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per 100 lb.	\$2.35 @ \$2.50
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Thermometers—

Tin Case, Cabinet, Flange,	
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Dairy, etc.	30¢@35%
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Ties, Bale—Steel Wire—

Single Loop	88 1/2¢@10%
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Monitor, Cross Head, etc. 70¢@7 1/2%	
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Tinners' Shears, &c.—

See Shears, Tinners', etc.	
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Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See Benders and Upsetters, Tire.

Tools—Coopers'—

L. & I. J. White	20@20&5%
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Haying—

Myers' Hay Tools	50%
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Ice Tools—

Gifford-Wood Co.	15%
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Miniature—

Smith & Hemenway Co.'s, David-	
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son, 1/2 doz., Nickel Plated, \$1.50	
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Gold Plated	\$2.00
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Saw—

Atkins' Cross Cut Saw Tools	35&5%
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Simond's Improved	33 1/2%
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Simond's Crescent	30%
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Ship—

L. & I. J. White	25%
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Torches—

Hammers, Engine, 1/2 doz.	\$4.50
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Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme, doz.	\$1.15 @ \$1.25; gro. \$1.50 @ \$1.60
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Harper, Champion or Paragon,	
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doz., \$1.25 @ \$1.40; gro. \$1.30 @ \$1.50	
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Game—

Imitation Onoda	75¢@10%
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Newhouse	50&5%
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Hawley & Norton	65&10%
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Victor	75¢@75&10%
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Onoda Community Jump	70&5%
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Stop Thief	60%
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Tree Trap	60%
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Hector	75¢@75&10%
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Mouse and Rat—

Mouse, Wood, Choker, doz. holes,	
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12¢	
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Mouse, Round or Square Wire,	
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doz. 85¢@90¢	
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Marty French Rat and Mouse Traps	
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(Genuine), 1/2 doz.	
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Crate lots. Small lots,	
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No. 1, Rat	\$11.50 \$14.50
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No. 3, Rat	\$5.75 \$6.50
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No. 5, Rat	\$4.70 \$5.25
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No. 5, Mouse	\$2.25 \$3.00
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Animal Trap Co.:	
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Out o' Sight, Mouse, 1/2 doz.	\$0.60
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Out o' Sight, Rat, 1/2 doz.	1.20
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Easy Set, Mouse, 1/2 doz.35
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Easy Set, Rat, 1/2 doz.85
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Out o' Sight Chokers, 1/2 doz.	holes
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Out o' Sight, Tin, 5-hole, 1/2 doz.12
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traps75
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Trowels—

Disston Brick and Pointing	25%
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Disston Plastering	20%
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Disston "Standard Brand" and Gar-	
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den Trowels	30%
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Kohler's Steel Garden Trowels, 1/2 doz. . . .	
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5 in., \$1.80; 6 in., \$6.00.	
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Never-Break, Forged Steel Garden	
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Trowels, in bulk, net 1/2 doz. \$5.50	
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In 1 doz. boxes	gro. \$6.00
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Woodrough & McParlin, Plastering	
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25%	
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Trucks, Warehouse, &c.—

B. & L. Block Co.:	
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New York Pattern	50&10%
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Western Pattern	60&10%
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Handy Trucks	1/2 doz. \$16.00
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Grocery	1/2 doz \$15.00
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McKinney Trucks	each, net \$10.00
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Model Store Trucks	1/2 doz \$18.50
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Tubs, Wash—

M'f'r's list, price per gross.	
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No. 0 1 2 3	
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Galvanized	\$67 \$79 \$89 \$99 10¢@7
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